FIFTH NATIONAL POST-CONVENTION NUMBER

Vol. III April, 1940 No. 2

The Journal of the International College of Surgeons

(Founded in Geneva, 1935)

PUBLISHED BIMONTHLY UNDER THE AUSPICES OF THE UNITED STATES CHAPTER

André Crotti, M.D., LL.D., F.A.C.S., F.I.C.S., International President
Fred H. Albee, M.D., Sc.D., LL.D., F.A.C.S., F.I.C.S., International President Elect
Frederick M. Douglass, M.D., F.A.C.S., F.I.C.S., President, United States Chapter
Desiderio Román, A.M., M.D., F.A.C.S., F.I.C.S., President Elect, United States Chapter
Max Thorek, M.D., F.I.C.S., F.I.C.A., Editor-in-Chief
A. L. Wolbarst, M.D., New York, and Roscoe Jepson, M.D., Menlo Park, Calif., Assistant Editors

EDITORIAL BOARD

Dr. Vincent A. Lapenta, Chairman, Indianapolis

Dr. Fred H. Albee, New York
Dr. Stanley E. Alderson, Albany, New York
Dr. F. de Amesti, Santiago, Chile
Dr. Charles H. Arnold, Lincoln, Nebraska
Dr. Nils Backer-Gröndahl, Bergen, Norway
Mr. Hamilton Bailey, F.R.C.S., London, England
Dr. William Seaman Bainbridge, New York
Dr. J. David Beatty, Los Angeles
Dr. Moses Behrend, Philadelphia
Dr. Abelardo Ibañez Benavente, LaPaz, Bolivia
Dr. Eduardo Bello, Lima, Peru
Dr. A. A. Berg, New York
Dr. P. Brooke Bland, Philadelphia
Dr. Gösta Bohmansson, Orebro, Sweden
Dr. Oswaldo P. Campos, Rio de Janeiro, Brazil
Dr. John E. Cannaday, Charleston, West Virginia
Dr. William J. Carson, Milwaukee
Dr. Jorge Cavelier, Bogota, Colombia
Dr. Juan M. Corpas, Bogota, Colombia
Dr. M. M. Cruickshank, Madras, India
Dr. Felix Cunha, San Francisco
Dr. Probodh Chandra Das, Calcutta, India
Dr. Alejandro Davalos, Asuncion, Paraguay
Sir Hugh Devine, Melbourne, Australia
Dr. Theodore J. Dimitry, New Orleans
Dr. A. Mario Dogliotti, Catania, Italy
Dr. Miguel Lopez Esnaurrízar, Mexico City
Dr. Francisco Fonseca García, Mexico City
Dr. Francisco Gentil, Lisbon, Portugal
Dr. Benjamin I. Golden, Elkins, West Virginia
Dr. Alberto Gutierrez, Buenos Aires, Argentina
Dr. Custis Lee Hall, Washington, D. C.
Dr. Johan Holst, Oslo, Norway
Mr. Godfrey Martin Huggins, F.R.C.S., Salisbury, Rhodesia, South Africa
Dr. Chevalier L. Jackson, Jr., Philadelphia
Dr. Arnold Jirasek, Prague, Czechoslovakia
Dr. Serge Judin, Moscow, U. S. S. R.
Dr. George B. Kent, Denver
Dr. Herman de Las Casas, Caracas, Venezuela
Dr. Géza de Lobmayer, Budapest, Hungary
Dr. Raymond W. McNealy, Chicago
Dr. Duncan Macpherson, New York
Mr. Rodney Maingot, F.R.C.S., London, England
Dr. Felix Mandl, Jerusalem, Palestine
Dr. Ralph C. Matson, Portland, Oregon
Dr. Tamosuke Mayseda, Tokio, Japan
Dr. P. L. Mirizzi, Cordoba, Argentina
Dr. William E. Mowery, Salina, Kansas
Dr. Oscar B. Nugent, Chicago
Dr. Raffaele Paolucci, Rome, Italy
Dr. Theodore Papayoannou, Cairo, Egypt
Dr. Lionel P. Player, San Francisco
Dr. D. S. Puttanna, Mysore, India
Dr. Fortunato Quesado, Lima, Peru
Dr. A. H. Roffo, Buenos Aires, Argentina
Dr. Karl R. Ruddell, Indianapolis
Dr. Henry M. Scheer, New York
Dr. Carl Semb, Oslo, Norway
Dr. Y. Seuderling, Helsinki, Finland
Dr. Thomas A. Shallow, Philadelphia
Dr. Alexander Stanischeff, Sofia, Bulgaria
Dr. Luigi Torraca, Naples, Italy
Dr. Thomas J. Tobin, New York
Dr. Edmundo Vasconcelos, São Paulo, Brazil

TERRITORIAL EDITORS

Dr. Rudolf Nissen, *for Europe*
Dr. Manuel A. Manzanilla, *for Mexico*
Dr. J. C. McCracken, *for China*

LIFE-LINE EXTENDED ... *in shock*

CORTATE prevented *surgical shock* in a series of twelve debilitated patients undergoing major surgical procedures, as reported by David Perla and his colleagues at Montefiore Hospital, New York City. ¶ **CORTATE** routinely pre- and post-operatively . . . in resection of colon . . . pneumonectomy . . . thoracoplasty. Result . . . "condition excellent . . . no signs of shock, felt well . . . excellent course[1]". ¶ Even in *burn shock* the new synthetic hormone desoxycorticosterone acetate caused a "remarkably prompt and complete" restoration of the blood chemistry, write Stewart and Wilson.[2] ¶ In *asthenia*, there is a rapid, continuous gain in weight and strength. Of the greatest importance in the new treatment of shock, burns, trauma, debility, marasmus, prolonged convalescence, and toxicity in infectious diseases is synthetic desoxycorticosterone acetate—Schering's

CORTATE

For additional information, please address the Medical Research Division

[1]Perla, D.; Freiman, D. G.; Sandberg, M., and Greenberg, S. S.: Proc. Soc. Exper. Biol. & Med. 43:397 (Feb.) 1940.
[2]Wilson, W. C.: and Stewart, C. P.: Edinburgh M. J., 46:153, 1939.

SCHERING

* Trade Mark Reg. U. S. Pat. Off.

Copyright, 1940, Schering Corp.

SCHERING CORPORATION
BLOOMFIELD NEW JERSEY

Medical
Arch
2-19-1941

Editorials

SURGERY IS MEDICINE

WAR is diplomacy by other means, according to Clausewitz, German military philosopher. Adapting this thought to the medical sciences, someone might suggest that surgery is internal medicine by other means. He could illustrate his suggestion by the following facts:

Internal medicine, among other measures, employs drugs to accomplish certain aims. In gastric hyperacidity associated with peptic ulcer, atropine frequently is administered in an attempt to reduce the amount of hydrochloric acid production. Similarly the reduction of hydrochloric acid production is the aim (it is a "medical" aim, and only the mode of precedure is different) when subtotal gastric resection is performed for the relief of peptic ulcer. Can it not be claimed that if the knife is, and can be, substituted for a drug—if surgery is resorted to instead of medical therapy—the purpose nevertheless remains identical, and "medicine" is being practiced, even though different means are employed? Or, if gastroenterostomy is performed for the purpose of permitting neutralization of the acid gastric contents by the regurgitation of alkaline intestinal juice, is not this surgical operation equivalent to the administration of alkalies, an obvious "medical" procedure? Similar examples of instances in which surgery is substituted for medical procedure can be cited, such as kidney decapsulation in acute nephritis for the purpose of improving the diuresis, or thyroidectomy for bringing about a better coronary circulation. In all these, surgery is "medicine" applied by other means.

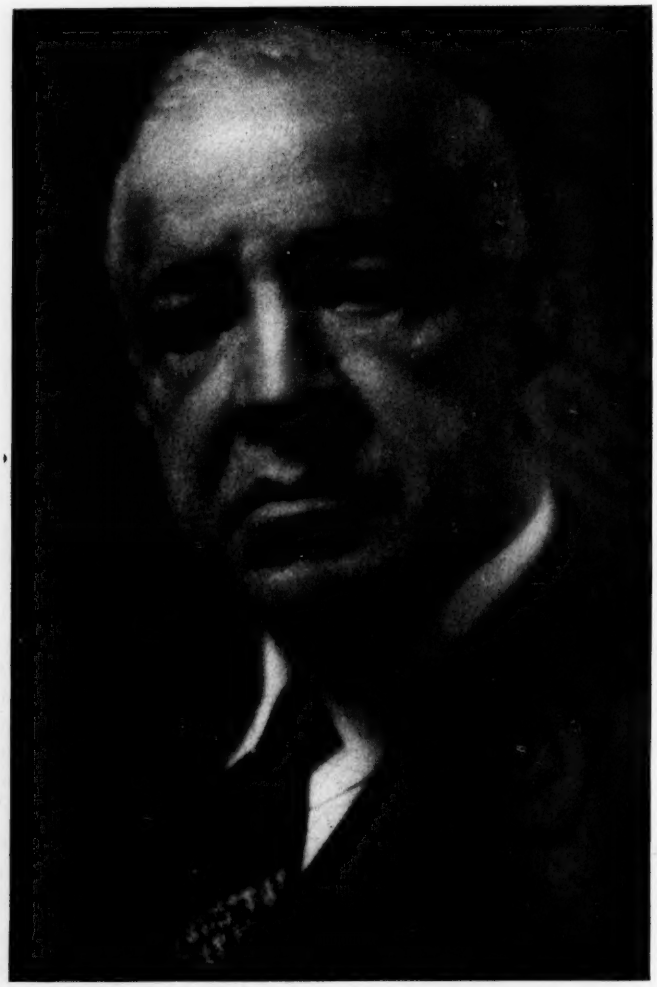
The foregoing examples form a part of the so-called borderline between medicine and surgery. There is yet another part of the area where medicine and surgery meet. This is where medicine comes to the aid of surgery in the pursuit of a surgical aim rather than where surgery joins medicine in the pursuit of a medical aim. This applies to those dietetic and medicinal measures used pre- and post-operatively to produce favorable operative circumstances and rapid and uncomplicated wound healing. The prevention of preoperative fear (particularly important in thyroid surgery) and of respiratory and circulatory disturbances associated with surgical intervention belongs in this category. The importance of dietetics in the acceleration of wound healing is being increasingly understood and appreciated.

From one point of view, almost all surgery borders on medicine. Traumatic surgery, which seems to be farthest removed from medicine, is, in a sense, the "purest" form of surgery. But even trauma may be based occasionally on disorders of the nervous and endocrine systems. The recognition of the presence of these factors can be of the utmost value to the traumatic surgeon.

EUGENE FOLDES

PRESIDENT-ELECT OF THE U. S. CHAPTER OF THE INTERNATIONAL COLLEGE OF SURGEONS

DR. Desiderio Román, A.M., M.D., was elected with acclaim to the presidency of the United States Chapter at the fifth annual assembly held in Venice, Florida, February 11-14.



DESIDERIO ROMAN, A.M., M.D., F.A.C.S., F.I.C.S., President-Elect of the United States Chapter of the International College of Surgeons.

Dr. Roman is a distinguished surgeon, an idealist, much beloved by his confrères and possessed of an ingratiating personality which attracts many friends and admirers. While a loyal American citizen and steeped in the ideals of our great democracy, he was named by the coalition (bi-partisan) commission for President of Nicaragua, his native land, at the suggestion of his nephew, Gen. Anastasio Samoza, now president of that country.

His enthusiasm for the ideals of the International College of Surgeons has been noteworthy since the inception of the organization. He is a Fellow of the American Medical Association and

(Please turn to page 106)

RECONSTRUCTION OF THE URETER

DR. RUDOLF NISSEN

ISTANBUL, TURKEY AND NEW YORK, NEW YORK

IN 1932 I performed on a male patient an operation, to be described below, for replacement of a last segment of the left ureter by a disconnected loop of the small bowel. By reason of existing circumstances, it was impossible to check the postoperative progress of this case at regular intervals. His communication, written about six and one-half years following the operation, states that he is in good health, and that while stones have formed on the side operated upon, these passed painlessly.

Our suggestion that he submit to pyelography at the hands of a well trained urologist was not followed. Since the outbreak of the present war we have had no means of communicating with the patient.

The original operation in this case consisted of performing a plastic procedure on the ureter and resorting to a plastic substitution for a portion of the ureter which had been destroyed.

There is a paucity of information in the literature as to how to deal with these cases, and therefore the operation to be described may prove of interest. The numerous indications for substitution of a ureter will not be entered into here, but suffice it to say that in most instances operative intervention is called for in cases of secondary operations where attempts at anastomosing the pelvis of the kidney and ureter, implantating the ureter into the bladder, or other procedures on the ureter have failed.

It is, of course, of importance to ascertain under such circumstances the condition of both kidneys should there be any tendency to nephritis on both sides. If such be the case, it becomes evident at once that conservative treatment of both kidneys is of utmost importance.

CASE REPORT

History of Illness. The patient upon whom the operation was performed suffered from bilateral ureteral calculi. Both ureters showed hydronephrosis of moderate degree. A stone blocked the left ureter and a stone was impacted at the junction of the lower and middle thirds. A number of attempts at ureteral catheterization were unsuccessful. Following the last catheterization a large paraureteral abscess developed. The surgeon who opened the abscess found a stone in the abscess cavity.

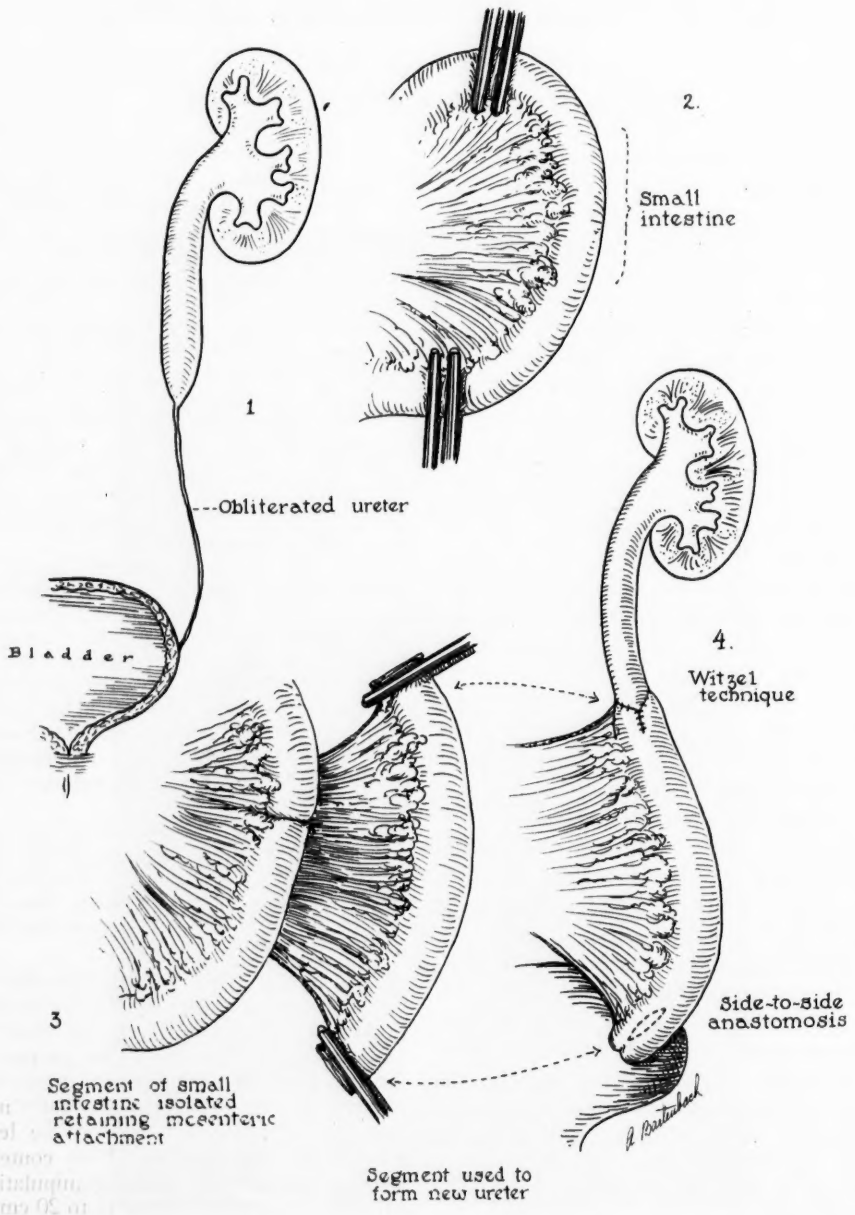
Following healing, a fistula resulted, from which urine discharged from the left kidney. An attempt to insert a ureteral catheter and another attempt to re-establish continuity of the ureter were unsuccessful.

It was in this stage that the patient came under our observation. We attempted at this time to expose the ureter proximal and distal to the fistula and to insert an indwelling catheter under ocular and digital guidance. We failed in this attempt. We found that the peripheral portion of the ureter was imbedded in a mass of firm scar tissue. The fistula itself was represented by a narrow tract. The central part of the ureter was markedly enlarged and its wall much thickened.

Because the patient wished at any cost to rid himself of the permanent fistula and because he refused to submit to a nephropyelostomy, and since a nephrectomy was contraindicated, the following procedure was resorted to:

Technic of Operation. After the central part of the ureter was freed for a distance of about 6 cm., the operative wound was closed provisionally and the patient was prepared for laparotomy. An infraumbilical incision of the abdominal wall was made. A freely movable loop of the small intestine on the left side was picked up, emptied of its contents, as much as possible, by digital manipulation and divided at two places about 15 to 20 cm. apart. An end-to-end anastomosis was performed. The disconnected loop of bowel was irrigated several times with rivanol solution and closed at both ends by inverting purse-string sutures.

An anastomosis was then performed between the lower portion of the disconnected bowel segment and the upper portion of the bladder covered with serous membrane, the anastomotic opening permitting the easy insertion of the



tip of the finger. The sigmoid flexure was then displaced laterally at about the level of the promontory of the sacrum. The posterior peritoneum was incised, and by careful blunt dissection of the tissues, a sufficiently wide channel was tunneled through to the original wound cavity in the region of the ureteral stump. The disconnected loop of intestine was placed retroperitoneally for a distance of about 10 cm. The peritoneum was sutured about the displaced segment of bowel and its mesentery in the best possible manner. The abdominal wall was then closed.

The original operative wound was then reopened. The central ureteral stump was then implanted into the displaced intestinal segment

in the same fashion as one would place the rubber catheter in performing a Witzel gastrostomy. The operative area was drained, the abdominal wound closed, and an indwelling catheter inserted into the bladder.

Result. Healing progressed satisfactorily. No serious infection from the bladder or pelvis of the kidney was noted, at least during the stay of the patient at our clinic, for several weeks. He was discharged from under our care with normal temperature and in good general condition.

POSSIBLE COMPLICATIONS

Despite the fact that six and one-half years have elapsed following this operation with satisfactory results, nevertheless one must remember that there are possibilities of some complications which may still ensue. The following of these may be mentioned:

First, stagnation of urine in the transplanted intestinal segment, which is greater in diameter than a markedly dilated ureter and possesses the drawback of lack of propulsion of the urine, such as is observed in the ureter following hypertrophy of its musculature.

Second, infection of the pelvis of the kidney or the bladder from the usual flora of microorganisms inhabiting the intestine; these are not much influenced by irrigation with antiseptic solutions.

Third, the possibility of urine damming back from the bladder into the transplanted segment of intestine, with the creation of a sort of pseudobladder.

Fourth, the danger of chemical damage to the very sensitive mucous membrane of the transplanted segment of small intestine subjected to the constant flow of urine or the presence of stagnated urine.

The possible development of the first three conditions enumerated should be searched for by subjecting the patient to scrutinizing investigations by means of pyelographic examinations. This was advised, but, as stated, the patient paid no heed to this counsel. That no severe infection has taken place is attested by the fact that the general condition of the patient is good. The wide anastomotic opening and the caliber of the new passage represented by the segment of transplanted bowel created the advantage that in case of recurrent stone formation, the passage of such calculi would be much facilitated. As a matter of fact, the patient reported symptom complexes indicating the passage of calculi, during which he experienced no attacks of colic.

INDICATIONS FOR OPERATION

Since an adequate study of this patient was not possible during the last few years, the method here described may be resorted to with certain reservations. In the opinion of the author, it is justified to recommend this operation for the reason that the problem of substituting greater segments of the ureter has not as yet been satisfactorily solved.

The author was unable to find any similar operation described in the literature.

SUMMARY

A case is reported in which the author substituted a segment of small intestine for a portion of a ureter destroyed by suppuration, through which a catheter could not be passed. A permanent ureteral fistula developed following the impaction of ureteral calculi and paraureteral abscess formation. The patient was discharged in good condition following the operation. Six and one-half years later he wrote that he was well, and that while he had passed stones during this period, he had had no colic.

RÉSUMÉ

La reconstruction de l'urétère

L'auteur substituta un segment d'intestin grêle pour une portion de l'urétère détruite par suppuration et qui était im-

perméable à aucune sonde. Une fistule urétérale permanente consecutive à l'enclavement de calculs urétéraux et d'abcès péri-urétéral survint. Six semaines après l'opération le malade quitte l'hôspital. Six ans et demi après il est en bonne santé. Il a passé quelques calculs durant cette période mais n'a eu aucune colique.

ZUSAMMENFASSUNG

Rekonstruktion des Ureters

Der Autor beschreibt einen Fall, in dem er einen, durch Eiterung zerstörten Ureter, durch den kein Katheder passieren konnte, mit Hilfe eines Dünndarmsegments ersetzt hatte. Eine permanente Ureteralfistel entwickelte sich infolge von Einklemmung von Ureteralsteinen und ein Periureteralabscess bildete sich. Der Patient wurde in gutem Allgemeinzustand entlassen und berichtete sechs Jahre später, dass es ihm gut ginge und dass er keine Steinkolik mehr gehabt hätte trotzdem er mehrere Steine ausgeschieden hatte.

SUMARIO

Reconstruccion del ureter

Un caso es reportado en el cual el autor substituye un segmento del intestino delgado por una porción de un ureter destruido por supuración, á travez del cual un cateter no podia pasar. Una fístula ureteral permanente se desarroyo despues del impacto de un calculo ureteral con la formación de un absceso paraureteral. El paciente fue dado de alta en buenas condiciones despues de la operación. Seis años y medio mas tarde él escribio diciendo que estaba bien, él no tuvo mas cólicos.

RIASSUNTO

Ricostruzione dell'uretere

Si riporta un caso nel quale l'autore ha sostituito un segmento dell'intestino tenue per una porzione di un uretere distrutto da suppurazione, attraverso il quale non si poteva passare un catetere. Una fistola ureterale permanente si sviluppò dopo l'ammassamento di calcoli ureterali, e la formazione di un ascesso paraureterale. L'ammalato fu rimandato a casa in buone condizioni dopo l'operazione. Sei anni e mezzo dopo egli scrisse che stava bene, e che sebbene avesse eliminato molti calcoli durante questo periodo, non aveva avuto nessun attacco colico.

NEW OFFICERS OF U. S. CHAPTER, INTERNATIONAL COLLEGE OF SURGEONS, ELECTED

Dr. Desiderio Roman, of Philadelphia, was elected president of the United States Chapter of the International College of Surgeons at the business session of the Scientific Assembly of the Chapter held in Venice, Fla., February 11-14. He will succeed **Dr. Frederick M. Douglass,** of Toledo.

Dr. P. Brooke Bland, of Philadelphia, was reelected first vice-president; **Dr. Duncan McPherson,** of New York, was chosen second vice-president, to succeed **Dr. Lionel P. Player,** of San Francisco; **Dr. Moses Behrend,** of Philadelphia, was reelected third vice-president; and **Dr. Raymond McNealy,** of Chicago, and **Dr. R. H. Dillehunt,** of Portland, Ore., were chosen fourth and fifth vice-presidents, respectively. **Dr. Benjamin I. Golden,** of Elkins, W. Va., succeeds himself as treasurer.

A NEW METHOD FOR INTRA-ARTICULAR ARTHRODESIS OF THE KNEE

PROF. A. M. DOGLIOTTI

Director of the Surgical Clinic of the Royal University

CATANIA, ITALY

THE method of arthrodesis of the knee which I have employed in certain cases tends to produce more constant and more rapid results than are obtained with other methods of surgery. The procedure is a very simple and yet a very efficient one.

It is unnecessary to discuss the various indications for arthrodesis. I shall only say that, although the extra-articular method has in many cases supplanted the intra-articular method, nevertheless it is necessary in certain cases to use the latter. Among these are certain forms of spastic contracture in flexion (i.e., Little's disease), the dangling paralytic knee and some rare cases of articular tuberculosis, in which conservative treatment is contraindicated because of the type of lesion, the age of the patient and other considerations. I shall limit myself to the technical problem of intra-articular arthrodesis.

DISADVANTAGES OF OTHER METHODS

Surgeons have employed many methods for securing fixation of the knee, the procedures consisting in the use of different types of resection and above all, in the use of free bone grafts and pedunculated bone grafts. Among the latter procedures, the methods preferred by most surgeons are those in which the patella is used (Hibbs, Vulpius, Albee, Schepelman). But at times the patella is insufficiently developed, or it is affected by a morbid process, and it therefore offers very little bone material, or it may be of insufficient length to use as a bridge support, and lastly, it is capable of a limited amount of osteogenetic activity.

Other methods that utilize bone grafts (those of Putti, Kajon, Bade, Rochet, etc.), with good results, nevertheless require at times complicated technical maneuvers and always present the added disadvantage that a very poorly vascularized bone graft is used. It is well known that a free bone graft, even though it is excellent material for a prosthesis, often becomes involved in processes of resorption and substitution and that fracture of the graft or resorption of it may occur before the reparative processes have assured solid immobilization of the limb. This happens when the vitality of the articular extremities is affected by general causes (syphilis, alteration of the metabolism, etc.), or by local causes (tuberculosis of the articular extremities, postoperative sepsis, trauma, etc.), by the excessive potency and persistency of the deforming forces (strong spastic contracture in flexion), or by marked disturbance of the trophism of the extremity (i.e., as a result of poliomyelitis). Consequently the method which will assure the success of the operation is one which permits the use of a healthy, pedunculated bone graft, well vascularized, of the exact dimensions required and sufficiently large to enable one to construct a solid bridge between the two articular extremities. Such a graft is easily obtainable, without complicated procedures, by using one of the articular extremities. These qualities are, in my opinion, embodied in the method which I shall now describe.

TECHNIC OF OPERATION

Arthrotomy is performed with the common anterior U-flap. The flap, which also contains

the patella, is raised and the lateral ligaments are severed, a strong flexion of the leg being necessary in order to expose completely the articulation. The two meniscuses are removed and then the proximal end of the tibia is sectioned transversely with a saw and an osteocartilaginous disc not more than 1 cm. in thickness is detached (fig. 1), in correspondence

RESULTS

Recovery has always been fairly rapid in patients operated upon by me, and the solidness of the knee has been perfect. Roentgenograms show healthy consolidation of the bone with active participation of the graft in the process

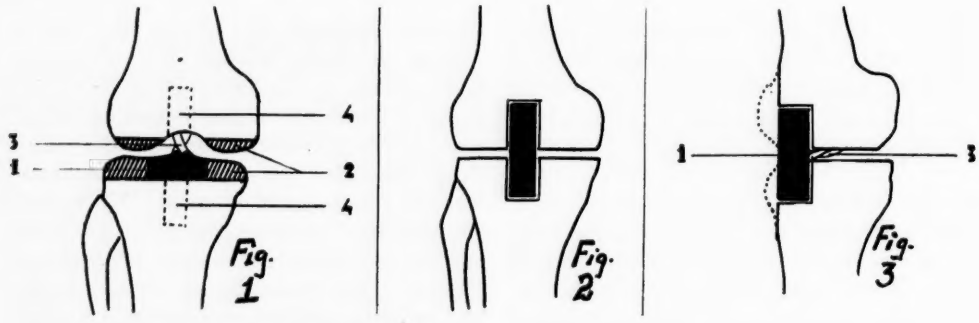


Fig. 1. *1,* Graft of tibial epiphysis (in black) which is to be used as the bone graft. This graft is vascularized by the crucial ligaments *(3). 2,* Parts of tibial and femoral epiphysis to be used (indicated by diagonal lines). *3,* Crucial ligaments, which are to be conserved. *4,* Site of incision which is to be carved on the anterior face of the femur and of the tibia, which is to receive the bone graft (indicated by dots).

Fig. 2. Bone graft (indicated in black) in place. Anterior view.

Fig. 3. Bone graft (indicated in black) in place. Lateral view. *1,* Bone graft. *2,* Crucial ligaments.

with the medial crest of insertion of the crucial ligaments. This disc remains connected to the femur by means of the crucial ligaments. The disc conserves good vascularization because of the vessels which pass along the crucial ligaments; this is demonstrated by the fact that the graft, when sectioned, bleeds. After the lateral parts of the disc are removed with osteotomic scissors, a healthy central graft remains (figs. 1, 2 and 3), connected to the crucial ligaments, and having the same length as the anteroposterior axis of the tibia. This bone graft, vascularized by the vessels of the crucial ligaments, is used for the fixation.

With the graft in readiness, the femoral condyles must now be levelled by a very superficial resection. Then with a scalpel a furrow having the exact proportions of the graft is cut on the anterior face of the articular extremities of the tibia and femur. The graft is then turned so that its long axis is parallel to the leg and so that its superior extremity is wedged into the tibial extremity. Thus the tibial and femoral extremities are brought closely together, the ligaments and skin are sutured and a cast is applied which insures complete immobilization for two months.

(figs. 4, 5, 6 and 7). The graft does not participate in the process of resorption and substitution usually noticed in free grafts but, because of its abundant vascularization, it takes part in the formation of callus, which renders the arthrodesis extremely sturdy.

INDICATIONS FOR USE

This method can be used when intra-articular arthrodesis in general is indicated and principally in cases of dangling paralytic knee and in severe forms of intractable spastic contractures of various origin. Regarding tuberculosis of the knee, I am convinced that my method can be used in some cases, because the tuberculous process in the first stage usually involves the femoral or tibial condyles (weight bearing parts of the articulation), while the intermedial part of the tibial epiphysis remains for

a long time free from involvement in the process. This, as has been noted, is because it is the part with the most adequate blood supply, which is provided by the vessels of the crucial ligaments, and it is less affected by the weight of the body due to the fact that it constitutes the wide intercondylar fossa of the femur. In these cases, after resection of the femoral and tibial condyles, the medial part of the tibial epiphysis can be conserved according to the technic described. If the vessels of the crucial ligaments are pervious, the pedunculated graft will bleed; thus good vascularization will be insured for the graft itself. The graft used will strengthen the arthrodesis after the resection. Moreover, we can depend on the beneficial effect of grafts in general in tuberculous processes.

Fig. 4. Case 1: roentgenogram, 45 days after operation.
Fig. 5. Case 2: roentgenogram, 12 months after operation.
Figs. 6 and 7. Case 3: 12 months after operation.

SUMMARY

The technic is described for effecting arthrodesis of the knee by means of a pedunculated bone graft removed from

the proximal end of the tibia. Recovery has been rapid and the solidness of the knee has been perfect in the author's cases.

RÉSUMÉ

Un nouvelle méthode d'arthrodèse intra-articulaire du genou

Ce procédé accompli l'arthrodèse du genou au moyen de l'ablation d'une greffe osseuse pedonculée. Cette greffe est enlevée de l'extremité proximale du tibia. La guérison dans les cas rapportées par l'auteur fut rapide et la solidité du genou est parfaite.

ZUSAMMENFASSUNG

Eine neue Methode für Intraarticuläre Arthrodese des Knies

Eine Technik wird beschrieben mit deren Hilfe eine Arthrodese des Knies mittels eines gestielten Knochentransplantats vom proximalen Ende der Tibia ausgeführt wird. Der Autor hatte eine sehr kurze Morbidität in seinen Fällen und die Festigkeit des Knies war sehr gut.

SUMARIO

Un metodo nuevo para artrodesis intra-articular de la rodilla

La técnica es descrita para afectar la artrodesis de la rodilla por medio de un injerto pedunculado de hueso de el extremo próximal de la tibia. Cura ha sido rápida en los casos del autor y la solidez de la rodilla ha sido perfecta.

RIASSUNTO

Un nuovo metodo per l'artrodesi intra-articolare del ginocchio

Si descrive la tecnica per effettuare l'artrodesi del ginocchio con un innesto osseo a peduncolo rimosso dalla estremità prossimale della tibia. Nei casi dell'autore la guarigione è stata rapida e la solidità del ginocchio è stata perfetta.

PRESIDENT-ELECT DESIDERIO ROMÁN

(**Dr. Román:** *Continued from page 98)*

a charter Fellow and a member of the Board of Governors of the American College of Surgeons; founder member of the American Board of Surgery; president of the Panamerican Medical Association (Philadelphia Chapter); surgeon-in-chief and head of the surgical department, first vice-president of the board of Trustees and a member of the staff executive committee, St. Luke's and Children's Hospital, Philadelphia; consulting surgeon to the Wilmington Hospital Association, Wilmington, Delaware, and United States delegate to the Panamerican Sanitary Congress in Washington, D. C., 1907. During the World War he rendered excellent service. He was chairman of the alumni association for volunteer service in the U. S. Medical Corps, and lecturer on the principles of surgery and surgical pathology, neurosurgery and orthopedics in the absence of the respective incumbents.

He is at present professor of clinical surgery in the Hahnemann Medical College and Hospital of Philadelphia; member of the National Council of Examiners of the International College of Surgeons; member of the Philadelphia County Medical Society and of its advisory committee; member of the Pennsylvania Medical Society; past president of the Oxford Medical Club and of the Homeopathic Medical Society of the County of Philadelphia (two terms); also guest lecturer on the history of medicine in the Medical Department of the Hahnemann Medical College and Hospital. He is a member of a number of fraternal organizations and of the college fraternity, Pi Upsilon Rho.

His leadership in surgery, his keen interest in the welfare of mankind, his mature experience in evaluating problems, both professional and civic, render him a worthy successor to the chair now ably occupied by Dr. Frederick M. Douglass.

GENERAL CONSIDERATIONS AND CRITERIA IN THE SURGERY OF THE THYROID GLAND*

DESIDERIO ROMAN, A.M., M.D., F.A.C.S., F.I.C.S.

Clinical Professor of Surgery, Hahnemann Medical College and Hospital,
Chief Surgeon, St. Luke's and Children's Hospital

PHILADELPHIA

IN retrospect of my subject, one can trace the comprehensive, but meaningless, term *goiter* to remote antiquity and find recorded evidence of obscure knowledge and faulty concepts. On the other hand, one finds that the treatment of tumefactions and lesions about the anterior and lateral aspects of the neck was clearly described in the Hippocratic era and in the writings of Aristotle, Celsus and Galen. Nevertheless, from our present knowledge of the function of the thyroid gland, it is obvious that from the beginning of time this organ has played an important rôle among the disturbances afflicting mankind.

EARLY DESCRIPTIONS

While in the pre-Christian era there appears no account or description of goiter as a disease or clinical entity, some references in the Hippocratic writings indicate that goiter was confused with scrofula and other enlargements about the neck. It is strange that Aristotle, who described the trachea and the surrounding structures, did not mention the thyroid gland, and yet it is of interest to observe that the use of iodine in the form of sea water and sea weeds—the Spongia Marina Tosta—for the treatment of tumors and swellings about the neck was quite in vogue among the Greeks in antiquity.

In the first century, a period of intellectual activity in the Latin medical culture of the Golden Age of Rome, the learned Celsus first described bronchocele as a "tumor between the skin and larnyx, which may be fleshy or may contain a sort of honeylike substance, sometimes even containing hair and small bones together." He recommended middle line incision and evacuation of the fluid, if any was present or, if the tumor was solid, withdrawal of it from the wound and treatment with liniments; but said he, "It is easy to remove it with the scalpel." This would indicate that the actual removal by extirpation was practiced at that time.

The prevalence of goiter in those days is further revealed by lay writers. Vitruvius, the architect of the Emperor Augustus Caesar, refers to goiter in his writings on aqueducts and water supply, in which he says that niter-containing waters have a tendency to diminish the size of goiter. Galen, in the second century, does not refer to goiter in his anatomic descriptions, but he speaks of tumors pressing on the windpipe and causing aphonia; he appears familiar with the recurrent laryngeal nerve and warns of the danger of injury to the nerve during operation. Galen and his contemporaries, Heliodorus and Antyllus, have left us no knowledge in reference to goiter, and for centuries their influence maintained silence on the subject.

In the sixth century, Aetius devotes a chapter to goiter. He defines bronchocele as a definite form of tumor involving the gland in front of the trachea and advises operation.

In the seventh century, Paul of Aegina decribes systematically every step and advises caution in the removal of goiter. In Bagdad, in the eighth century, Rhazes

*Read at the Fifth Assembly of the International College of Surgeons, Venice, Florida, February 13, 1940.

discusses the surgical and medical treatment of the disease, while Avicenna in the same University, in the ninth century, sets forth the details of the operation and the dangers attending it.

LATER DESCRIPTIONS

The first accurate anatomic description of the thyroid gland comes to us from Wharton, in the seventeenth century; apparently ignoring its function, he named the thyroid from the Greek word meaning "shield."

Haller, in the eighteenth century, was the first to prove that the thyroid is a gland of internal secretion, and Cruveilhier, in the middle of the nineteenth century, demonstrated beyond peradventure of a doubt that the gland has no duct and that its secretion enters directly into the blood stream. From then on, the histology and physiology of that important organ were gradually brought into knowledge.

THYROID DEFICIENCY

Claude Bernard and Brown-Séquard, Schiff and Curling led in the experimental work on the thyroid secretion and its importance to the human well being, as well as to the phenomenon of myxedema.

Reverdin, Billroth and Kocher, with their surgical accomplishments, made possible the structural study and interpretation of the functional problems involved by cachexia strumipriva of Kocher. At the same time Horsley proved that myxedema, cretinism and cachexia strumipriva were due to the same cause, thyroid deficiency, and that they were remediable by the administration of thyroid extract alone.

Recognition of deficiency in thyroid secretion as a clinical condition came to us from Billroth and Kocher, who drew their conclusions from clinical observations and from their early experiences with thyroidectomy, following which 96 per cent of the patients manifested symptoms of hypothyroidism or cachexia strumipriva. Schiff in 1884, after animal experimentation, laid the foundation of organotherapy.

EXOPHTHALMOS

The mere observation of the coexistence of goiter, exophthalmos and palpitation—the exophthalmic syndrome, designated the cardinal triad by Flajani in 1788—was followed in 1835 by the clear portrayal of hyperthyroidism as a distinct disease. This was done in a very direct way, by Robert Graves, of Dublin, who wrote, "The enlargement of the thyroid seems to be essentially different from goiter in not attaining a size at all equal to that of goiter and seldom attains serious deformity."

Basedow, in 1840, recognized the cardinal symptoms of exophthalmic goiter, but considered the condition to be due to a masked scrofula.

EFFECT ON HEART

The recognition of the cardiac symptoms of hyperthyroidism and of the immediate benefit to the heart following operation are achievements of our present generation in thyroid surgery, for Kocher, the master mind and pioneer of thyroid surgery, credited the postoperative benefit to the heart not to the thyroidectomy but rather to the postoperative rest, etc.

The significance of the toxic symptoms in Graves' disease in relation to the heart—the so-called "goiter heart"—belongs to the advancements in our modern knowledge of toxic goiter, and the direct benefit to the heart results from the removal of the thyroid, subtotally, or totally, as may be indicated. The improvement in the cardiac condition and the pulse rate are directly due to the reduction of toxic absorption by thyroidectomy.

ADVANCES IN SURGERY

We entered a new era in our modern concepts of the thyroid functional phe-

nomena about the time when anesthesia and antisepsis came into use. Billroth's early experiences showed a mortality of 40 per cent, and Bruberger reported 82 operations prior to the antiseptic period with a mortality of 34 per cent.

According to Halsted, Sir William Blizard was the first to ligate a thyroid artery for the cure of toxic goiter, and Porta first ligated the superior and inferior thyroid arteries. Boeckel, and not Kocher, as generally accepted, is responsible for the "collar incision," while Von Mikulicz originated the bilateral resection of the gland.

It is hard to realize that the advances in thyroid surgery, following the epoch-making contribution of Billroth and his pupils, Von Mikulicz and Wölfler, and the brilliant work and teachings of Kocher and Reverdin of Geneva were met by opposition based on fear. In fact, there were few surgeons prior to 1850 brave enough to undertake or advocate thyroid removal, as shown by the attitude of the profession in France, where the French Academy of Medicine prohibited the operation, and in England, where it found feeble support. There the great Liston admitted the underlying difficulties in the vascularity of the thyroid when he declared, in 1846, "You cannot cut the thyroid gland out of the living body in its sound condition without risking the death of the patient from hemorrhage." In 1870, Samuel D. Gross of Philadelphia, the great surgeon, teacher and writer, drew a picture of the path of the goiter surgeon: "Every step he takes will be environed with difficulty, every stroke of his knife will be followed by a torrent of blood, and lucky will it be for him if his patient lives long enough to enable him to finish the horrid butchery."

Dieffenbach wrote, in 1848, "The operation for goiter is one of the most thankless, most perilous undertakings, which, if not altogether prohibitive, should at least be restricted to certain varieties of the malady."

Watson, the Scotchman, pioneer in thyroid surgery in Great Britain, was one of the first to connect the postoperative improvement in cases of toxic goiter with the operation. He practiced ligature *en masse* of the lateral lobes before excision, with minimum loss of blood. Kocher, successor to Lücke as director of the Berne Clinic, is, without doubt, the master and the organizer of modern goiter surgery. His distinguished pupil, our learned Professor Crotti, placed the surgical world under everlasting obligation when, in 1918, he published his treatise on the diseases of the thyroid and thymus glands.

The anatomopathologic studies of tumors of the thyroid were first undertaken by Ecker and Rokitansky from 1840 to 1850; continued by Porta, Friedreich and Billroth in 1855; and eloquently described by Virchow in 1867. Virchow endeavored to demonstrate the unity of the origin, beginning with the secreting epithelium of the thyroid, of all true goiters, whatever may be the ultimate structural change, such as colloid, cystic or fibrous goiter.

GOITER A MARK OF BEAUTY

Goiter in the ordinary or common form, the simple or nontoxic type without symptoms or discomfort, the endemic variety, if you please, has not always been considered as a deformity or a physical defect. In fact, within the past century, in certain goiter districts or communities, such as the Valais in Switzerland and the Tarentaise and the Maurienne in the Franco-Swiss frontier, it was considered as a mark of beauty; so much so, that young women with large necks (goiter enlargements) were chosen in matrimony in preference to their sisters without goiters, and if the bilateral swelling of the neck happened to permit the gold heart pendant of a necklace to lodge comfortably between

the lobes, it was a mark of extreme beauty and distinction which made the young woman especially desirable as a bride.

In 1751, Keyssler, during a journey through the Valley of Aosta, heard the sermon of a priest who reprimanded his parishioners for being distracted from the Mass by the presence of a stranger with a neck deprived of goiter swelling. The priest said, "My brethren, let us not be proud of the physical betterment that our Lord has given us and of which he has chosen to deprive others."

AUTHOR'S EXPERIENCE

The general considerations and criteria in the surgery of the thyroid gland in all types of goiter are based, in our own personal experience, upon more than 20,000 cases, of which 7,340 have been operated upon over a period of 33 years; of these, 6,340 cases have been definitely reported.

The first series of 2,000 cases operated upon and which we reported in 1907 presented a very light syndrome of toxicity which we did not actually recognize, or no signs and symptoms which, in the light of our present knowledge, would be classed as toxic manifestations. Most of our cases were endemic in type. Many of the patients, referred to us by other friendly patients, submitted to operation solely for the removal of the disfiguring growth, at times notwithstanding the opposition of the family physician; some were prompted to seek surgical relief of pressure symptoms or vocal disturbance. Our operative technic followed the collar incision of Boeckel and the cautious intracapsular extirpation of the incomparable Kocher, whose meticulous care we witnessed many a time. Our results were uniformly gratifying and uneventful. No deaths occurred from sepsis or from hemorrhage, and the few remote fatalities we observed were from malignant metastasis, cardiovascular or cardiorenal complications or suddenly from embolism, the total number of deaths being less than 3 per cent.

Our second series of 2,000 thyroid operations reported in 1917 brings out our experience with hyperthyroidism as a factor in postoperative recovery, and especially the immediate postoperative storm, for which we had limited experience and which we combated only on a symptomatic basis instead of by metabolic management, the value of which was insufficiently understood at that time. With it all, however, our total mortality rose only to slightly over 4 per cent.

In our third series of 2,000 operations, reported in 1927-28, the increasing incidence of toxic phenomena with marked metabolic unbalance, emotional instability and cardiovascular damage made our operative work more hazardous than in our early experience, but pari passu with these problems of postoperative reactions, postoperative storms or thyroid crises, we began to receive help from the researches and experiences of the leading thyroid clinics of the world. With this help we overcame the difficulties which we encountered and entered upon a new era of selective preparation of our patients, thus lessening the risk and doing away with disturbing complications.

The last 340 cases (of our series of 6,340 accurately reported) were uniformly hospitalized for observation and clinical study, in preparation for surgical treatment. The study included carefully recorded case histories and a clinical check-up on basal metabolism; blood chemistry, with emphasis on blood cholesterol, calcium and phosphorus; blood counts, electrocardiographs and fluoroscopy. These patients were given special diets and rest with the definite purpose of increasing their weight, it being our judgment, drawn from our own experiences, that no thyrotoxic patient is a fair operative risk when losing weight, notwithstanding rest, sedation and hypercaloric and nutritious diet.

In this series we encountered recurrences of hyperthyroidism in 3 to 5 per cent of the cases, and persistence of hyperthyroidism following operation in 2 per cent of the cases. Three cases of this series manifested slight tetany which disappeared within a few days, and temporary myxedema which corrected itself without any special treatment within six weeks to three months. Postoperative aphonia of a few days' duration has been observed in a few instances where radical extirpation has been carried out, but without injury to the recurrent laryngeal nerve as proven by the complete return of vocalization.

The histologic study of the tissue removed was invariably checked against the clinical picture of the individual case in an effort to correlate postoperative clinical and diagnostic findings with tissue changes in the thyroid gland.

The wealth of planned classifications of goiters, such as Plummer's, DeQuervain's and Sloan's, serve their purpose in covering the multiplicity of types of structural changes in the thyroid parenchyma, both in the physiological as well as in the morbid conditions, but diagnostic classification loses its charm at the operating table and at the bedside, and no particular value comes to us from fixing a standard of clinical guidance based upon the network of the structural variety. Symptomless goiters often present surprising histologic pictures, while goiters with a marked clinical syndrome reveal simple structural changes.

In our large thyroid clinical material, we have operated upon true lingual goiters (located at the embryonal anlage) and also sublingual goiters, a number of thyroglossal duct cysts and pyramidal lobe hypertrophies, retrolaryngeal and retrotracheal goiters and retrosternal, intrathoracic and mediastinal goiters, all of which, by virtue of their abnormal position, the pressure which they exert upon important adjacent structures and their vulnerability to rapid retrogressive degeneration and malignancy, should be dealt with surgically as early as diagnosed. Fluoroscopy and x-ray films are of value in verifying or excluding the entension of thyroid enlargements into the thoracic cavity, for abundant subcutaneous fat and marked muscular development often obscure palpatory signs of retrosternal or intrathoracic extension of the lateral and the median lobes.

CASE REPORT

The single case of lingual goiter, the only one we have encountered, merits some reference in that we did not operate for the removal of a lingual goiter but for a tumor at the base or root of the tongue in front of the epiglottis at the foramen caecum, the embryonic location of thyroid tissue.

The patient was a young Italian multipara, who recited the following unusual but arresting story: that she was usually pregnant every year for the past six years, that for the first three months of each of her pregnancies she had bleeding from the mouth, and that a lump at the base of the tongue became larger and would bleed. She was referred to me by a nose and throat specialist, who suspected that the growth might be malignant, notwithstanding the fact that the condition had existed for three or four years.

For the removal of the tumor, we carried out the following technic, briefly described: extraction of a central tooth of the mandible, division of the mandible at that point and lateral retraction of the ramus, thus permitting forward traction of the tongue and free exposure. A week before this operation, we had performed a low tracheotomy, and during the present operation, by tube and ether insufflation through the tracheotomy opening, the patient received general anesthesia, the pharynx having been packed with moist sterile gauze. The tumor was radically extirpated and the base of the tongue reconstructed. To our surprise, the pathologist reported that the specimen demonstrated nothing but thyroid tissue, and he suggested that, by virtue of the comprehensive resection, we had probably removed her entire thyroid gland and that we should look for signs and symptoms of myxedema. Sections of the tissue were sent to the Mayo Clinic which confirmed the histologic report. The patient made an uneventful re-

covery and has enjoyed excellent health, without any manifestations of thyroid deficiency. The inference is that accessory thyroid tissue elsewhere in the neck or chest is supplying her functional demand for thyroid.

OTHER CASES

The continuity of structure of the thyroid gland, especially with reference to lymphoid tissue, and the vulnerability of the thyroid to infection from tonsillar and pharyngeal foci has afforded us opportunity to see a number of cases of acute metastatic thyroiditis running a typical clinical course of acute infection with resolution and return to normal. We have also treated two cases of metastatic inflammation of one lobe of the thyroid following acute tonsillitis, with coagulation, necrosis and sloughing of the entire left lobe of the thyroid, which was easily enucleated, capsule and all. The wound was closed with drainage. Good recovery resulted.

We have had only one case of true tuberculous inflammation of the thyroid gland with caseation of the thyroid tissue and the formation of a retrosternal tuberculous abscess, which healed only after trephining the sternum at the most dependent portion of the abscess in order to obtain better drainage. Apical tuberculosis over limited areas was demonstrated by x-ray films, but the patient regained good health and remained well during the ten-year follow-up.

We observed the case of a male, 40 years of age, who had what can be properly termed a vascular goiter and whom we demonstrated in the Students' Clinic, but with whom further follow-up is impossible because his whereabouts are unknown. This man showed a normal neck in the anteroposterior as well as in the lateral positions. On palpation we detected a soft throbbing area in the lateral aspects of the lower neck. On auscultation we found no aneurysmal signs, but when the patient held his breath at full and complete inspiration, we observed the appearance of the two lobes of the thyroid, just above the suprasternal notch, of the typical pyramidal shape of the thyroid connected by the isthmian portion. As soon as he released his inspiratory control, we observed the gradual disappearance or emptying out of the vascular tumor. Our inference was that the thyroid enlargement was, for the most part, made up of vascular tissue composed of a network or plexus of thyroid veins and arteries in scant mesh or fibrous stroma, with probably little or no glandular element.

We had two cases of apoplexy of the thyroid, if I may be permitted to use this figure of speech to describe sudden hemorrhage within the thyroid capsule.

One was the case of a woman 58 years old with a large globular goiter of long standing, endemic in type. One evening, without trauma and without initial pain, she experienced profound syncope and her family physician found her in collapse, with all evidence of internal hemorrhage. Her large goiter showed rapid swelling and tension and caused increasing pain. A diagnosis of hemorrhage within the goiter seemed obvious to the attending physician. Rest and supportive treatment appeared adequate, since the hemorrhage was self limited within the thyroid capsule. Aside from added pressure from the sudden distention from hemorrhage and clotting, causing dyspnea, the patient reacted, and a thyroidectomy performed a few days later demonstrated large clots in the center of a widespread area of colloid cystic thyroid degeneration. Close examination of the tissue showed sclerotic arteries and a thick external capsule, which withstood the concentric pressure from the bleeding.

A second case of hemorrhage in degenerating goiter, involving, however, only the left lobe, revealed marked local arteriosclerosis in a focus of limited bleeding.

Cases of chronic fibrous thyroiditis with positive blood Wassermann reactions, which responded to antisyphilitic treatment, have been helped without surgery. Huge degenerating goiters, partly intrathoracic and mediastinal, with varicosity of the veins of the thoracic wall and arm, hemothorax and heart dis-

placement have been relieved by thoracocentesis and cured by thyroidectomy in two stage intervention.

Our citation of these unusual cases, while having no practical value in daily thyroid clinical observations, illustrates the many sided morphology and morbidity of the thyroid structure.

TREATMENT

The criterion of the late Dr. John B. Murphy in reference to the broad application of surgical procedure in the treatment of goiter, briefly summarized, was that exophthalmic goiter or primary hyperthyroidism should be treated surgically, and that simple nontoxic goiters, including all other types of long standing goiter tumors in patients over 25 years of age, should be considered selective for surgery.

Pubertal goiter, or rather thyroid hypertrophy appearing in the premenstrual age and continuing to full adolescence, demands conscientious judgment on the part of the general practitioner as well as the surgeon to avoid error in treatment. Thyro-ovarian unbalance may be physiological, and if this is the case, the routine administration of iodine or iodides is contraindicated and frequently is harmful; this is also true of surgical procedure. General hygienic and dietetic regulations often encourage nature's functional adjustment.

The menopausal threshold in the presence of long standing goiter, accompanied by the neurocirculatory syndrome, vasomotor phenomena, etc., frequently leads to a misinterpretation of etiologic factors; here again cautious evaluation of signs and symptoms may prevent hasty conclusions and needless surgery.

Hyperthyroidism, on the other hand, permits early and radical surgical treatment, and, equipped as we are with measures of diagnostic aid and adequate preparation, radical surgery is definitely successful. Barring a small percentage of cases of recurring or persistent hyperthyroidism which require reoperation, surgery still affords the most effective cure for hyperthyroidism.

Inasmuch as the primary etiologic factor in Graves' disease is almost certain to exist outside the thyroid itself, further research is needed to elucidate this question; the suspected pituitary has not yet been proved to be the causal agent. Absurd as it seems to remove the thyroid, which is perhaps merely the victim, the practical experience of surgical results needs no further proof.

All forms of simple goiter, with or without hereditary background, which have long been apparent, even though not disturbing the health and fitness of the individual, should be regarded as potentially surgical, on the following counts: First, all long standing thyroid growths tend to eventual retrogressive degeneration, toxic functioning or malignancy; second, long standing goiters slowly and insidiously upset metabolism, and through toxic damage to the cardiovascular system by toxic activation, ultimately present the thyrocardiac syndrome of premature senility with attending complications brought about by long standing thyrotoxicosis.

CONCLUSION

In conclusion, we have briefly reviewed the chronological evolution and the salient landmarks in the history of goiter as recorded in the annals. We have cited outstanding clinical experiences in our work since 1897, with extensive and varied goiter material. We have kept in close touch with the leading thyroid clinics of the world and are conversant with the abundant literature from research sources and clinicians and have guided our own observations with the wealth of contributions from leading authorities. We believe with sincere conviction that until further research and experiment reveal the effects of prophylaxis on goiter incidence and until other successful methods of treatment

are discovered, surgery will continue to provide the largest measure of help and cure in disorders of the thyroid gland.

SUMMARY

Although iodine in the form of sea water and sea weeds was used by the Greeks in antiquity for the treatment of tumors and swellings about the neck, it was not until the nineteenth century that the histology and physiology of the thyroid gland were known. Goiters occurring at puberty and at the menopause require cautious evaluation in order to prevent hasty conclusions and needless surgery. All cases of exophthalmic goiter or primary hyperthyroidism and all cases of goiter of long standing in patients over 25 years of age should be considered selective for surgery.

DISCUSSION

DR. ANDRÉ CROTTI (Columbus, Ohio): Modesty and a sense of justice is always the hallmark of superiority. Dr. Roman, by his thoroughness in presenting the historical aspect of goiter problems and thus according credit where it belongs, sets an example which it would be well to follow. Similar examples of the latter were shown yesterday in the papers of Dr. DeMuth and Dr. Temple Fay, both of whom went to great lengths to give credit to the ones who have preceded them in their fields and to whom they accorded priority.

Anyone who has had a large experience in thyroid pathology reaches the conclusion which Dr. Roman reached today, namely, that most of the goiters are surgical entities. He cited a few exceptions and gave excellent reasons to support his view, a point of view which today is accepted by the great majority of surgeons. In my own experience I follow the same principles. When confronted with a goiter the first step is to classify that goiter, to settle in one's own mind that that thyroid condition is either a simple medical problem or a surgical case. Second, the question imposed is whether that goiter is of the toxic or nontoxic variety. Third, what is the line of conduct to be followed? Let us assume that we are dealing with a nontoxic goiter, of colloid, cystic, calcareous or other type. Such goiters will not yield to any form of treatment and are essentially surgical problems from the start. Assuming that the particular thyroid condition is purely of the parenchymatous type and toxic, the vast majority of these cases are surgical. However, in young individuals up to the age of 18 years, in incipient forms of thyrotoxicosis with undesirable glandular enlargement, though the toxic symptoms be very marked, I do not like to resort to surgery. However, I operate, have operated and will continue to do so later if these patients do not respond to medication and especially to x-ray therapy. In young individuals x-ray therapy is very valuable and in certain instances frustrates the necessity to operate. I recently saw a woman about 26 years of age affected with what Dr. Roman described as "nontoxic vascular goiter." The pulse ranged between 65 and 70 beats per minute; there was no tremor and no ocular symptoms. She had a marked puffiness of the whole face and there was no pitting on pressure. She gave the impression of hypothyroidism with myxedematous symptoms. To all intents and purposes this case should be treated with thyroid medication, despite the high metabolic rate, which was plus 22. Another young boy had a metabolism of 24 minus, with exophthalmos and vascular gland and all the symptoms pointed to toxic goiter. Thyroid medication completely relieved him in about three weeks, with disappearance of all vascular and ocular symptoms. Individualization and proper classification are the keynotes to proper therapy. I enjoyed immensely Dr. Roman's presentation, and I desire to extend to him my heartfelt congratulations.

DR. M. L. CURTNER (Vincennes, Ind.): I should like to ask if x-ray would be of any benefit in diagnosing substernal goiter.

DR. C. D. BROOKS (Detroit): I wish to say just one word regarding Dr. Roman's paper. He said, "Don't let the metabolic rate tell you whether or not you should operate." If the patient doesn't do well, doesn't sleep well, doesn't eat well and hasn't gained weight, postpone the operation until he does. Don't let blood cholesterol or any other laboratory test tell you that you can go ahead and do a one-stage operation, that you had better do in two. Let your clinical judgment guide you more than laboratory tests. Sometimes laboratory tests are worth nothing at all, but when a patient doesn't sleep well and doesn't eat well under moderate and good conditions, it is best to take the internist's advice and treat the patient further medically.

DR. ROMAN: Answering the question as to whether x-ray is of help in diagnosing substernal goiters, it is of help. I referred to it. A fat neck, also a masculine development, can conceal thyroid hypertrophy and there the x-ray shadow is of value.

RÉSUMÉ

Considerations générales sur la chirurgie de la glande thyroïde

Les anciens Grecs utilisaient l'iode sous la forme d'eau de mer et de plantes aquatiques d'eau saline dans le traitement des tumeurs et gonflements cervicaux. L'histologie et la physiologie de la glande thyroïde sont des découvertes du dix-neuvième siècle. Les tumeurs thyroïdes de la puberté et de la ménopause souvent ne demandent aucune intervention chirurgicale. Les cas de goître exophthalmique et tous las cas de goître de longue durée sont du domaine de la chirurgie.

ZUSAMMENFASSUNG

Kurzer Rückblick und allgemeine Betrachtungen über die Chirurgie der Schilddrüse

Trotzdem Jod in der Form von See-

wasser und Tang schon von den alten Griechen für die Behandlung von Tumoren und Schwellungen des Halses angewandt wurde, wusste man bis zum neunzehnten Jahrhundert nichts über die Histologie und Physiologie der Schilddrüse. In Bezug auf die chirurgische Behandlung von Störungen der Schilddrüsenfunktion sollte folgendes beachtet werden: In Kröpfen der Pubertät muss die Indikation sehr sorgfältig gestellt werden, da die Natur sehr oft mit einiger Hilfe eine funktionelle Rückkehr zur Norm bewerkstelligt. Die Gegenwart von Kröpfen an der Schwelle der Wechseljahre erfordert ein ebenso gewissenhaftes Denken um über ilte Schlüsse und unnötige Chirurgische Eingriffe zu vermeiden. Andererseits sind alle Fälle von éxophtalmischem Kropf und primärem Hyperthyreoidismus potentielle chirurgische Fälle und alle anderen Arten von lang dauernden Kröpfen in Patienten über 25 sollten für Chirurgie in Betracht gezogen werden.

SUMARIO

Retrospectiva breve y consideraciones generales en el criterio de la cirugía de la glandula tiroidea

Aunque yodo en la forma de agua marina y plantas marinas fue usado por los Griegos antiguos para el tratamiento de los tumores é inflamaciones de el cuello, no fue hasta el siglo XIX que la histología y fisiología de la glandula tiroidea fue conocida. El aproche quirúgico en el tratamiento de los trastornos de el tiroide, lo siguiente debe ser observado: En bocios de la pubertad, juicio conciente debe de ser ejercido, tan frecuentemente como la ayuda natural haga sus ajustamiento funcional. La presencia de un bocio en la menopausia, igualmente requiere cuidado y evaluación para evitar concluciones rapidas y cirugía innecesaria. De otro modo, todos los casos de bocio exoftálmicos ó hipertiroidismo primario son casos quirúgicos potenciales, y todos los otros tipos de bocios de larga duración y tumores en enfermos de mas de veinticinco años de edad, deben de ser considerados como selectivo para cirugía.

RIASSUNTO

Breve sguardo e considerazioni e criterii generali sulla chirurgia della ghiandola tiroide

Sebbene lo iodio nella forma d'acqua e di erbe marine, fù usata dagli antichi Greci per la cura dei tumori e gonfiori del collo, non fù che nel 19mo secolo che l'istologia e la fisiologia della ghiandola tiroide fù conosciuta. Nella cura dei disturbi della tiroide, dal punto di vista chirurgico, le seguenti idee dovrebbero essere osservate: Nei gozzi della pubertà, si deve esercitare giudizio scrupoloso, dato che frequentemente, con un poco di aiuto, possono riaggiustarsi funzionalmente. La presenza del gozzo al principio della menopausa, similmente, richiede evaluazioni caute per prevenire conclusioni premature e chirurgia superflua. D'altra parte, tutti i casi di gozzo esoftalmico o di ipertiroidismo primario sono possibili casi chirurgici, e tutti gli altri tipi di gozzi di lunga durata in ammalati sopra i 25 anni d'età dovrebbero essere considerati eccellenti per la chirurgia.

METHODS PREFERRED IN CLEFT-LIP AND CLEFT-PALATE REPAIR*

WARREN B. DAVIS, M.D., D.Sc., F.A.C.S.

Clinical Professor of Oral Surgery, Jefferson Medical College, Philadelphia
From the Maxillo-Facial Division of the Department of Surgery, Jefferson Medical College Hospital

PHILADELPHIA

THIS presentation will not attempt any review of the extensive cleft-lip and cleft-palate literature, or descriptions of the many operations which have been devised for the correction of these deformities, but will be limited to the methods which in our own experience and observations covering a period of 27 years have proved to be of the greatest practical value in securing the best functional and cosmetic results.

We believe cleft-lips should be repaired as soon as the child is in sufficiently good condition to stand the operation. That is usually some time between the third day and the third month. Simple incisions as a rule give better anatomic approximations than do those with complicated geometric designs. The

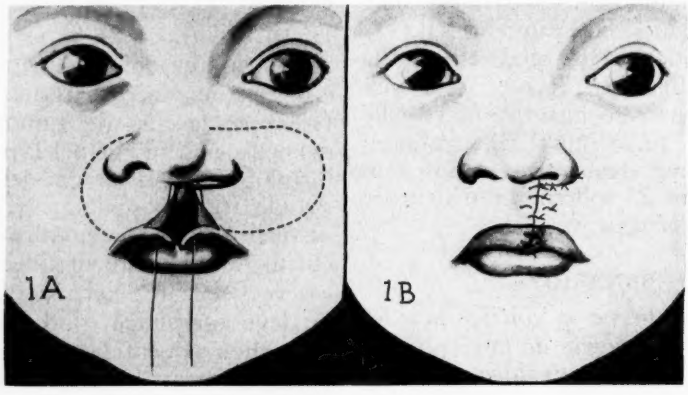


Fig. 1. *A*, Semi-diagrammatic sketch showing incisions used in unilateral cleft-lip repair. Dotted lines indicate extent to which lip and cheeks are freed from the anterior walls of the maxillae. Incisions to form the flaps shown followed the vermilion border. The lines above the points from which the superior ends of the flaps came outline incisions which will be carried slightly more than half way through the superior portion of the margins of the cleft, thus forming flaps which will be turned posteriorly and sutured together, adding somewhat to the thickness of the lip in that area. The heavy line indicates location of a through and through incision carried from the alar fold to the margin of the lip to facilitate placing the ala at the proper elevation and making the nostril approximately the same size as that on the sound side. *B*, Drawing showing margins of cleft approximated. Some tissue was removed from the medial portion of the alar flap to form a nostril of proper width. Excess portions of marginal flaps were excised; sufficient tissue was left to give slight fullness to free edge of lip. A Logan bow is routinely used for 8 days to eliminate tension of suture lines.

*Read at the Fifth Assembly of the United States Chapter of the International College of Surgeons, Venice, Florida, February 13, 1940.

scarring is usually less conspicuous, and the later muscle action and the expression about the mouth are more nearly normal than in those cases in which muscle fibers are not placed in their normal direction.

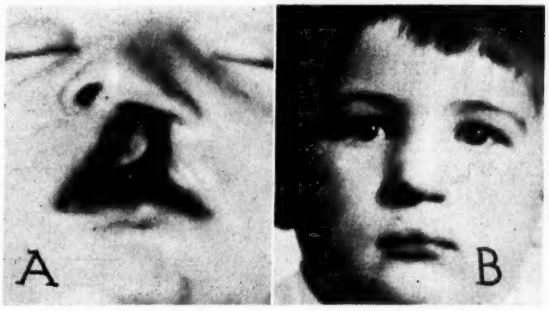


Fig. 2. *A* and *B*, Case No. H-248. *A*, Age four months. Complete unilateral cleft lip and cleft palate, with marked rotation of premaxilla. *B*, Age six years, showing contour of lip and nostrils. Operation was by method outlined in Fig. 1.

Fig. 2. *C* and *D*, Case No. H-125. *C*, age 7 months. Incomplete unilateral cleft lip. Note the absence of muscle tissue between the superior angle of cleft and floor of nostril and the consequent widening of the nostril. *D*, Appearance of lip and nose 10 months after operation.

UNILATERAL CLEFT LIP

In our early cleft-lip work, we followed chiefly the basic principles of J. E. Thompson's methods, later making such variations, modifications and additions as were found better adapted to the different types of deformities or to the requirements of the individual case. In 1929 and 1930, the majority of our cases of *unilateral* cleft lip were repaired by the Mirault-Blair method, but in 1931 we returned to and have continued to use our modified Thompson method.

Technic. The incisions now used in unilateral clefts are shown in Fig. 1. With the lip freed from the maxillae as outlined, the margins of clefts are readily approximated without undue tension. We find a through and through incision in the line of the alar fold and thence extended slightly downward to the medial margin of the lip to be of great value in obviating the angulations about the alae and also in providing a better skin surface to form the floor of the anterior naris. In making the approximations, the alae must be placed on the same level and the nostrils made approximately the same size and as nearly symmetrical in contour as can be obtained.

After the sutures which hold the alae in their proper position, the next most important suture is the one accurately approximating the vermilion border. In finishing the free edge of the lip, just enough of the flaps is removed to leave sufficient fullness to avoid any notching from subsequent contraction in the suture line (fig. 1*B*). In repairing an incomplete cleft

lip, the incisions must be carried into the nasal floor in order to secure approximation of muscle tissue in the upper portion of the lip and a nostril of the proper width.

it sometimes gives rather good-looking nostrils, but the lips are apt to be unsatisfactory later because of a tight trans-

Fig. 3—Case No. H-16. *A*, Age four weeks. Bilateral cleft lip and cleft palate. *B*, Showing appearance of lip and nostrils two months after operation. The philtrum was trimmed to a "V" shape and the lateral portions of the lip were approximated to it and to each other below the apex of the philtrum. Note the tightness of lip between the vermilion border and the philtrum. *C*, Tightness of lip is exaggerated by crying, smiling or laughing.

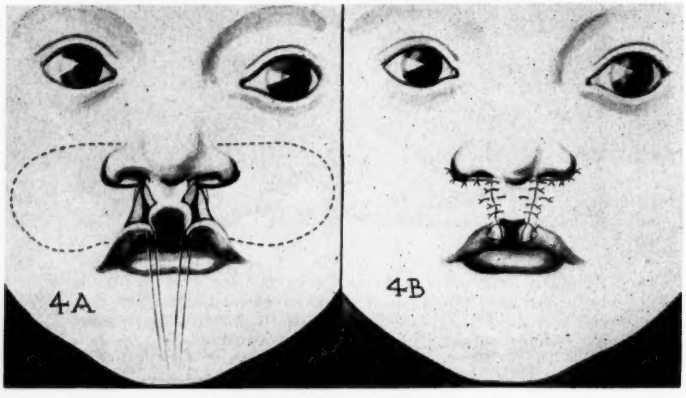


Fig. 4. *A*, Semi-diagrammatic sketch showing incisions used in first stage of our repair of bilateral cleft lip. Note that the entire philtrum is preserved. Dotted lines indicate extent to which lip and cheeks are freed from the anterior walls of the maxillae. Heavy lines indicate incisions through entire thickness of lip starting in alar folds and extending to edge of cleft in lip to allow placing alae in better position to form symmetrical nostrils of proper width. *B*, Margins of clefts and flaps have been approximated. Note the excess fullness of free edge of lip at each side of philtrum. These prominences are advanced into the midportion of free edge of lip at the next operation.

BILATERAL CLEFT LIPS

The repair of bilateral cleft lip by trimming the philtrum to a "V" shape and approximating the lateral portions of the lip to it and to each other below

verse line which tends to form between the vermilion border of the lip and the apex of the triangulated philtrum. This tight line becomes more apparent when the patient is smiling, laughing or cry-

ing (fig. 3*B, C*). Therefore, since 1918, we have seldom used that method, preferring to preserve the entire philtrum by our method shown in Fig. 4. This method requires two operations, preferably one to two years intervening between them, but the ultimate results more than justify the additional hospitalization and secondary adjustments. In cleft lip repair is the advancement of the lateral fullness formed by the first operation into the free margin of the philtrum, as shown in Fig. 6. The photographs of the case in Fig. 7 show the results of such repair. Note the lack of transverse tension in the lip.

In bilateral cases with marked protrusion and rotation of the premaxilla,

Fig. 5.—Case No. H-172. *A*, Age five weeks. Complete bilateral cleft of lip and palate with marked anterior rotation of premaxilla. *B*, Age seventeen months. Appearance of lip and nostrils 15½ months after first stage of repair by method shown in Fig. 4. Lateral fullness of free margin of lip will be advanced into midportion at next stage of operation as shown in Fig. 6.

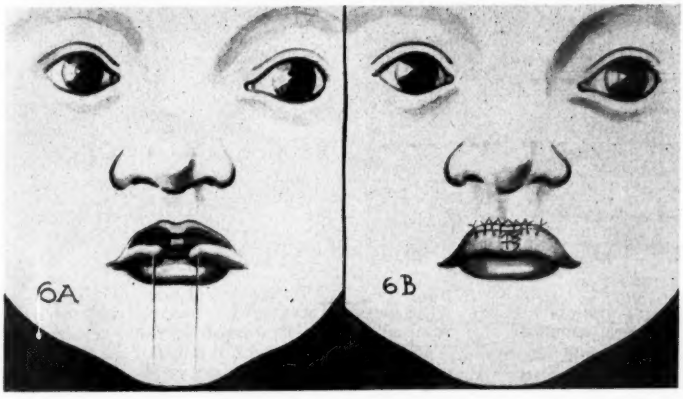


Fig. 6. *A*, Semi-diagrammatic sketch showing incisions by which the lateral fullness formed by the first step in bilateral cleft-lip repair (Figs. 4 and 5) are made into single-pedicled flaps to be advanced to meet each other in the mid-line. Heavy line in lip indicates incision carried vertically into lip for an average distance of 1/6 inch. This forms a recess between the skin and mucous membrane surfaces into which the advanced flaps are placed. *B*, The ends of flaps are sutured together, then sutured to the skin and mucous membrane margins.

the interval between the operations, the continuous downward and lateral traction made upon the philtrum by the lateral portions of the lip greatly increases the size of the philtrum in all its dimensions (fig. 5), allowing it to fulfill its normal functions in the formation of the central portion of the lip.

The second operation in the double it is best to avoid, when possible, the excision of any portion of the vomer. Such excisions, whether triangular or quadrilateral in shape, usually leave the premaxilla unduly movable. If the premaxillary protrusion is so great that closure of the clefts in the lip cannot be completed without undue tension, we have found that carefully splitting the

vomer and bulging its sides (fig. 8) will often allow the premaxilla to be placed in a better position without causing its permanent mobility. The premaxilla very seldom requires wiring in infants, but in some older children it may be necessary in order to secure the best cosmetic results.

In some instances a third operation involving the lip may be indicated to elevate the tip of the nose. In such cases the central portion of the philtrum is elevated and advanced sufficiently with the columella to place the tip of nose where desired. This was done in the case shown in Fig. 7*D*.

In secondary reconstruction of poorly repaired lips, it may be necessary to make incisions sufficiently extensive to convert the lip into its original type of cleft and then reconstruct it from that point. In some instances, the depression of the nasal tip and the poor contour of the dorsum nasi can be definitely improved at the one operation (fig. 9).

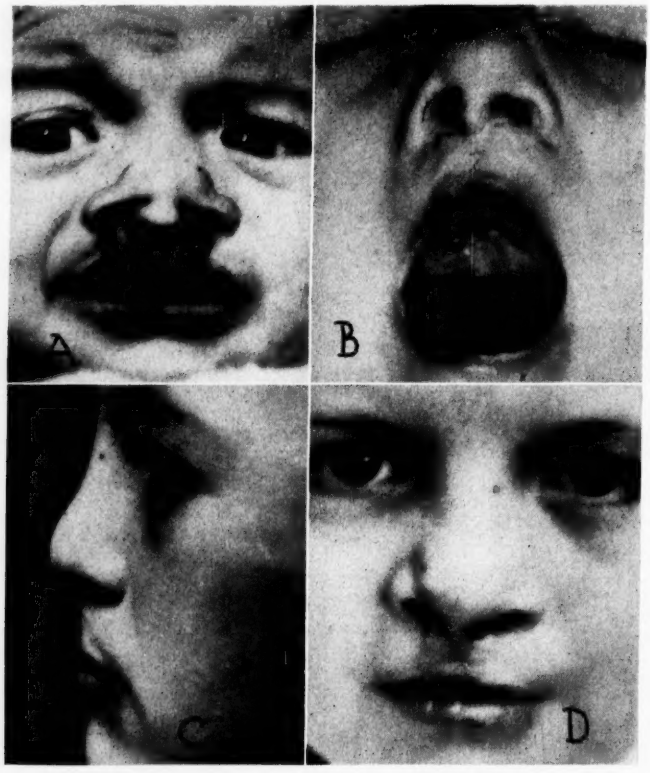


Fig. 7.—Case No. H-273. *A*, Age 2½ months. Complete bilateral cleft of lip and palate. Note marked rotation of premaxilla and shortness of columella. Lip repaired in two operations by method described in Figs. 4 and 6. *B*, Age 6 years, showing contour of repaired lip, nostrils and palate. *C*, Note absence of any contraction line in lip. *D*, Tip of nose was elevated by advancing midportion of philtrum to lengthen columella.

CLEFT-PALATE REPAIR

Our most satisfactory functional results in cleft-palate repair have been obtained in the cases operated upon some time between the ninth and the twenty-second months, variations in the exact

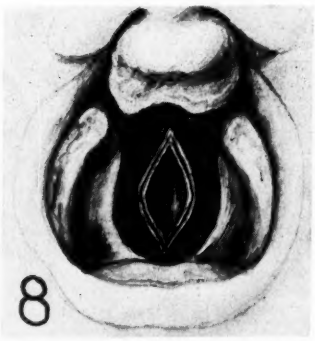


Fig. 8. Semi-diagrammatic sketch showing location of incision allowing antero-inferior portion of the vomer to be split to permit bilateral bulging of the sides of the vomer when the premaxilla is placed in more nearly normal position.

Fig. 9.—Case No. H-1097. *A*, Age 25 years. Poorly repaired bilateral cleft lip with excess scar tissue and undue anterior prominence of philtrum. *B*, Profile showing excess convexity of dorsum nasi exaggerated by the traction on tip of nose because of short philtrum. *C*, Philtrum was elevated and advanced with the short columella to place tip of nose in better position. Greater portion of excess convexity of nose removed at same operation. *D*, Three-quarter view appearance of lip and nose three months after operation.

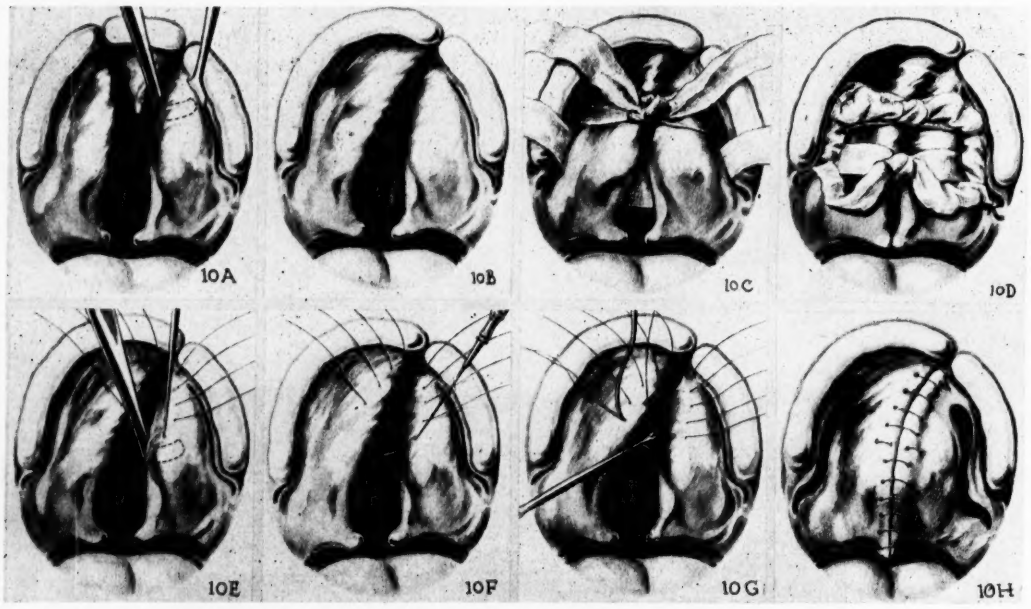


Fig. 10. *A,* Drawing of complete bilateral cleft palate showing incisions carried through mucoperiosteum of alveolar processes. Mucoperiosteum has been loosened from the alveolar processes to the beginning of the horizontal processes of the maxillae and the palate bones. A sharp thin chisel is shown in position to divide the bone. Firmly supporting the horizontal processes with the retractor while the chisel is being used helps to prevent the bone in the flap from being loosened from the mucoperiosteum. *B,* Drawing of complete unilateral cleft palate showing outline of incisions used in loosening the mucoperiosteal flap on the side attached to the vomer; also the osteo-mucoperiosteal flap containing the horizontal process of the maxilla and of the palate bones on the unattached side. *C,* Drawing of complete unilateral cleft palate showing iodoform gauze tapes passed completely around the osteomucoperiosteal flap and the mucoperiosteal flap. The tapes are tied so as to hold the medial margins of the flaps in apposition, or nearly so. Care should be taken that the pressure from the tapes is not sufficient to shut off circulation. *D,* Drawing showing both tapes tied and their ends used as packs in the lateral incisions to control any bleeding from branches of the posterior palatine vessels. *E,* Drawing showing the insertion of 00 wire sutures *before* the mucous membrane is removed from the medial margins of the flaps. Note that the osteoplastic flap is firmly supported by the retractor while a hole is being drilled through the bone where the last wire suture will be placed. *F,* Drawing showing 00 wire suture passed through drilled hole in osteoplastic flap, using a special carrier needle. *G,* Drawing showing silk suture passed through flap by means of a carrier staff needle. The suture is picked up as shown, the carrier needle withdrawn and the sharply bent end of the wire placed in the loop of silk thread and then drawn through the flap. *H,* Drawing showing the wire and black silk sutures tied. A single iodoform gauze tape will be placed around the flaps and tied just tight enough to take tension from suture line without interfering with circulation, such tape to be removed in 3 or 4 days. Lateral incisions heal rapidly by granulation.

time elected depending upon the child's general health, freedom from paranasal sinus infections and the width of the cleft.

Palatal clefts in which the hard palate is involved—unilateral or bilateral, incomplete or complete—are preferably repaired by a two-stage operation, the operations usually being from 7 to 12 days apart. Osteoplastic flaps are used in practically all cases. In bilateral clefts, an osteoplastic flap is brought medially from each side, while in unilateral clefts an osteoplastic flap is brought medially from the side not attached to the vomer and a mucoperiosteal flap is brought from the attached side. The detailed technic of this operation was described in a paper published in the *Pennsylvania Medical Journal,* November, 1939. Fig. 10, *A-H,* is from that publication and with the legends, I believe the pro-

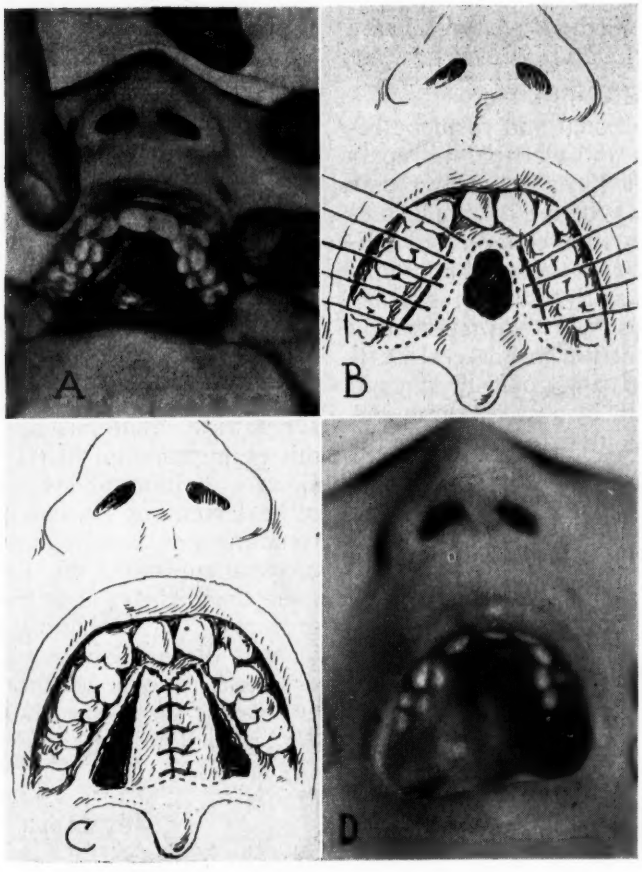


Fig. 11. Case No. H-29. *A*, Age 17 years. Bilateral cleft of palate to premaxilla. Opening persisting in the hard palate after an unsuccessful attempt to repair cleft by use of mucoperiosteal flaps when patient was one year old. *B*, Semidiagrammatic sketch of palate shown in *A*. Dotted line indicates margins of bony cleft. Incisions through mucosa and bone of horizontal processes of maxillae and palate bones indicated by lateral lines. Wire sutures, size 00, are shown in position. *C*, Semidiagrammatic sketch showing approximation of the margins of the opening shown in *A*. The sites of the green-stick fractures are indicated anteriorly, as are the posterior ends of the bones in their new position. *D*, Photograph of palate two months after operation.

cedure is readily understood. This method is of advantage because it gives a minimum raw area on the nasal side of the palate and consequently less scar tissue contraction; moreover, by securing the greatest possible length to the palate and the least interference with muscle action, it gives the best speaking voice we have obtained. In some cases speech is practically normal without special training, but in the majority of cases speech training is of value, when and where the cooperation of an adequately prepared teacher is available.

Closure of openings which persist in the hard palate after unsuccessful attempted repair by the use of mucoperiosteal flaps we find most satisfactorily ac-

complished by very little modification of this osteoplastic method. A typical case is illustrated in Fig. 11.

SUMMARY

Our best functional and cosmetic results in cleft-lip and cleft-palate repair have been obtained by: (1) early repair of lip defects; (2) the use of simple lines of incision rather than complicated geometric designs; (3) accurate anatomic approximations, with the least possible trauma to tissues; (4) the preservation of the entire philtrum in bilateral cleft-lips; (5) the use of osteoplastic flaps in cleft-palate repair; by a two-stage operation and meticulous care in cutting the flaps and in inserting the wire sutures, bone is now very seldom lost from the flaps; (6) obtaining the greatest possible length to the palate, the minimum scar tissue contraction and the least interference with muscle action, which gives the best quality speaking voice; (7) speech training in many cases, when and where an adequately prepared teacher is available.

RÉSUMÉ

Les methodes préferées dans la réparation du bec-de-lièvre et des fentes palatines

Les méthodes que 27 années d'expérience ont permis à l'auteur d'obtenir les meilleurs résultats fonctionnels et cosmétiques sont décrites dans cette communication. L'auteur recommande: 1°. la réparation précoce de la fente labiale; 2°. l'emploi d'incisions simples de préférence aux incisions géométriques compliquées; 3°. le rapprochement anatomique exact; 4°. la conservation du philtre dans le cas de becs-de-lièvre bilateraux; 5°. le recous dans les fentes palatines à des lambeaux osteoplastiques; 6°. d'obtenir la plus grande longueur possible du palais et le minimum de contraction cicatricielle et d'interférence fonctionelle des muscles afin d'assurer la meilleure voix possible; 7°. un enseignement phonétique bien réflechi et prolongé.

ZUSAMMENFASSUNG

Methoden der Wahl in Hasenscharten- und Gaumenspaltenplastik

Der Autor beschreibt Methoden die im Lichte seiner 27 jährigen Erfahrung die besten funktionellen und kosmetischen Erfolge zu verzeichnen haben. Folgende werden empfohlen: Frühe Plastik des Lippendefekts; die Anwendung einfacher Inzisionen anstatt schwieriger geometrischer Figuren; sorgfältige anatomische Annäherung mit geringst-möglichen Trauma für die Gewebe; Erhaltung des ganzen Philtrum in beiderseitiger Hasenscharte; die Anwendung von Knochenlappen für Gaumenspaltenplastik; die Erzielung einer grösstmöglichen Länge für den Gaumen, geringste Narbenkontraktur und die kleinste Beeinträchtigung der Muskeltätigkeit um eine bestmögliche Stimme zu ermöglichen; Sprachübungen, wenn ein speziell vorbereiteter Lehrer verfügbar ist.

SUMARIO

Método preferido en la operación del labio leporino con hendidura de la boveda palatina

Métodos ideados en la experiencia de 27 años produciendo los mejores resultados funcionales y cosmeticos en el tratamiento del labio leporino son descritos aqui. Lo siguiente es aconsejado: (1) reparación temprana de los defectos del labio; (2) el uso de lineas de insición simples en lugar de los diseños geometricos complicados; (3) perfecta aproxcimación anatómica, con el menos traumatismo posible de los tejidos; (4) preservación completa de el filtrum en labio leporino bilateral; (5) el uso de colgajos e osteoplasticos en la reparación de la boveda palatina; (6) obteniendo la reparación mayor posible, la menor retracción cicatricial, y la menor interfe-

rencia con la acción muscular para asegurar la mejor calidad en la voz; (7) ejersicio de lenguaje en muchos casos, si un maestro experto esta al ancance.

RIASSUNTO

Metodi preferiti nel riparo del labbro leporino e della fessura della volta palatina

Si descrivono i metodi, che, in 27 anni, hanno prodotto i migliori risultati funzionali e cosmetici nel riparo del labro leporino e la fessura della volta palatina. Si consigliano i seguenti: (1) riparo al piu presto possibile dei difetti del labbro; (2) uso di linee d'incisione semplici invece di disegni geometrici conplicati; (3) approssimazioni anatomiche accurate, con il minimo trauma possibile ai tessuti; (4) preservazione dell'intiero filtro nel labbro leporino bilaterale; (5) l'uso di lembi osteoplastici nel riparo di fessure palatine; (6) ottenere la piu grande lunghezza possibile nel palato, minima contrazione della cicatrice, ed il minimo impedimento con l'azione dei muscoli per assicurare la migliore qualita di voce; (7) in molti casi, esercizio della favella se si puo trovare un insegnante adequatemente preparato.

• • •

H. E. Jordan of the University of Virginia was elected president of the American Microscopical Society at Columbus on December 28. **Raymond J. Pool,** University of Nebraska, was chosen first vice-president; **Ruth Marshall,** Rockford College, Illinois, second vice-president; **J. E. Ackert,** Kansas State College, secretary (to serve three years); and **Asa C. Chandler,** Rice Institute, member of the Executive Committee (to serve three years).

CERTIFICATES OF MERIT

Certificates of merit for the best scientific exhibits at the Fifth Annual Assembly of the U. S. Chapter of the International College of Surgeons held February 11-14 at Venice, Florida, were awarded to **Dr. Dewell Gann,** Little Rock, Ark., **Dr. Morton I. Berson** and **Dr. Mortimer M. Kopp,** both of New York City.

• • •

THE NEXT INTERNATIONAL ASSEMBLY OF THE INTERNATIONAL COLLEGE OF SURGEONS WILL BE HELD IN MEXICO CITY, MEXICO AUGUST 10-14, 1941.

• • •

HAVE YOU PAID YOUR DUES? THESE SHOULD BE REMITTED TO DR. BENJAMIN I. GOLDEN, DAVIS MEMORIAL HOSPITAL, ELKINS, WEST VIRGINIA.

EFFECT OF TRANSPLANTS FROM THE RENAL PELVIS ON THE HEALING OF DEFECTS OF BONE

EGIDIO TOSATTI, M.D.

From the Surgical Clinic of Prof. R. Paolucci, Royal University of Rome

ROME, ITALY

DURING the last decade many workers have published the results of their experiments on the heteroplastic formation of bone following the transplantation of epithelium from the urinary tract. Clinical observations have led to the conclusion that the epithelium of the human urinary tract does not behave differently from that of certain animals (dogs, rabbits) as regards the ability to produce heteroplastic bone formations (Huggins, Lozzi, Tosatti[1]).

Heteroplastic ossification from autotransplantation of epithelium of the urinary tract has been observed at various sites: subcutaneous tissue of the ear, of the abdomen, of the head, in striped and unstriped muscles, aponeurotic sheaths, synovial membranes, peritoneum, brain, parotid gland and, recently, also in the liver and spleen (Tosatti[2]), in both of which results had previously been constantly negative.

RESULTS OF OTHER WORKERS

Recently it has been proved that not only auto- but also homotransplantation can give positive results with heteroplastic ossifications (Tosatti[1]) despite what had been asserted previously (Löwy and Bertrand, etc.). The practical importance of such results cannot be overlooked.

In 1934 two American surgeons, Copher and Key, first produced the healing of extensive defects of bone substance, experimentally produced in the ulna of a dog, by means of an autotransplantation of mucous membrane of the bladder. In the following years, Leriche and Lucinesco in France and Carone, Paggi and Mastrosimone in Italy carried out a series of experiments on autotransplantation of mucous membrane of the bladder. Their results, on the whole, confirm those of the American investigators.

With the same method Mastrosimone and Bezza recently obtained the heteroplastic formation of bone even on the inner surface of defects created in a dog's skull.

However, it was still doubtful whether ossification between the two ends of resected ulna was due not to the influence exercised by the transplanted urinary bladder epithelium, but rather to an attempt at repair caused by the presence of the periosteum (in the space corresponding to the resected bone fragment). Wishing to eliminate such a doubt, Copher recently resumed his experiments with a series of researches which differed from his previous ones conducted in collaboration with Key in the following points: (1) transplantation of the urinary bladder was performed only when, 14 to 16 weeks after the subperiosteal resection of the ulna, roentgenologic examination showed that the periosteum alone was unable to produce any evident bridging between the two ends of the resected ulna; (2) experiments were carried out on a group of animals in which the fragments of the ulna had been removed together with the periosteum. From these researches Copher concluded that the presence of the periosteum alone is not responsible for the healing of the bone defects in the ulna (ranging in length from 2 to 5 cm.) produced by subperiosteal resection, and that, when the periosteum is removed along with the fragments of the ulna, the union

caused by action of the bladder epithelium is not nearly so solid as when only subperiosteal resection is performed. (See also Leriche[3], 1939.)

AUTHOR'S EXPERIMENTS

In the above experiments only autotransplantations of epithelium of the urinary bladder have been done.

With a series of researches begun this year I shall attempt to determine whether: (1) implanted renal pelvis can be utilized to bridge defects of bone in a dog's ulna, produced by subperiosteal resection; (2) the presence of any tissue other than the epithelium of the urinary tract is capable of inducing ossification between the two ends of a bone sub-

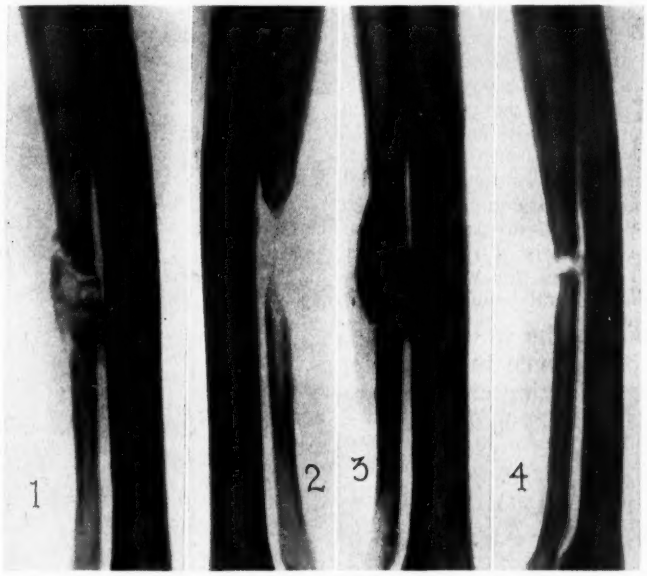


Fig. 1. Dog No. 3: Roentgenogram of right ulna (in which transplantation of renal pelvis has been done) three months after intervention. No sign of atrophy between the two ends; formation of a notable bony mass (with cystic cavities) not yet solidly uniting the two ends. Fig. 2. Dog. No. 3: Roentgenogram of left ulna (control) seven months after intervention. Decrease in diameter, rarefaction, atrophy of the ends; lack of ossification between the two ends. Fig. 3. Dog. No. 3: Roentgenogram of right ulna (with transplantation of pelvis seven months after intervention). Still no sign of atrophy between the ends; formation of an oval mass, thicker than in Fig. 1 (still of cystic aspect); this mass unites the two ends solidly. Ossification of the interosseus membrane. Fig. 4. Control: Roentgenogram of right ulna seven months after the subperiosteol resection of a bone fragment 1 cm. long.

In certain researches carried out last year I proved that auto- and homotransplants of urinary epithelium can induce the heteroplastic formation of bone, and that with the transplantation of the renal pelvis this formation can be obtained also in the liver and spleen, in both of which previous attempts had been unsuccessful.

periosteally resected (this control, hitherto untested, is obviously of the greatest importance); (3) homotransplants, as well as autotransplants, are capable of giving positive results.

In this paper I am reporting only the results arrived at in the first and second part of my researches: that is, whether ossification of the bone defect can be

produced by means of autotransplants of the renal pelvis.

For this study I used four dogs weighing respectively 12,100, 14,500, 17,200 and 17,500 kilograms.

TECHNIC. Chloroform anesthesia was given. The diaphyses of both ulnas were exposed and a bony fragment 3 to 4 cm. in length was removed subperiosteally from each (Leriche, 1939). The wounds were covered with gauze pads. The left kidney was then removed and the lumbar wound also covered with gauze. From the removed kidney a portion of pelvis 3 to 4 cm. in length and 2 cm. wide was excised. This piece was placed between the ends of the right ulna. In two cases the left ulna was used as a control, and in each of these a piece of renal parenchyma, of the same size as the piece of renal pelvis used in the left ulna, was placed between the ends of the left ulna. In the other controls no transplant was made between the two ends of resected ulna. The muscles and skin of all wounds were sutured, the lumbar wound being closed last.

In all the animals the wounds healed by first intention. Seven months later the animals were all living and had perfect use of the legs which had been operated upon.

ROENTGENOLOGIC EXAMINATION

The roentgenologic examination of the forepaws was repeated several times after intervention (at intervals of 30, 60, 90, 140, 180 and 210 days). From these examinations it was evident that in the control ulnas (in two cases a fragment of renal parenchyma had been transplanted; in the other cases, after subperiosteal resection, no transplant had been done at all) there had occurred a decrease in diameter, rarefaction and atrophy of the ends, with no noticeable attempt at bridging the defect of the bone. In those ulnas with transplanted renal pelvis tissue there was a progressive growth of a thick tubular mass, within which cystic-like areas of various sizes and shapes could be seen, solidly uniting the two bony ends as early as the third to the fifth month after the transplant.

The roentgenograms of one of the animals used in the experiment (dog No. 3) show this clearly (figs. 1-3).

Figure 4 shows the roentgenogram of an animal on which (for completely different researches) a simple subperiosteal resection of a small fragment (1 cm.) of the ulna was done. This roentgenogram was made seven months after intervention. Even though the bone defect was quite small, the attempt at repair appears to be absolutely inadequate and

Fig. 5. Dog No. 3: To the left, left ulna (control) showing atrophy of the ends, with no osseous union. To the right, right ulna (with transplanted pelvis), showing growth of a narrow, thick tubular mass of bone solidly uniting the ends of the ulna. No atrophy of the ends.

cannot be compared to the results obtainable with transplants from the kidney pelvis. According to Leriche[3], it is obvious that, even with small defects of the ulna, repair cannot take place after subperiosteal resection alone.

MACROSCOPIC EXAMINATION

The animals were killed 229 days after intervention. Macroscopic examination of the anatomically prepared ulnas in which transplantation of the kidney pelvis had been performed showed in each animal a thick, oval mass of newly formed bone 3 to 4 cm. long and 2 to 2.5 cm. wide. This mass united solidly the ends exactly where the subperiosteal resection had been made (fig. 5). The new osseous growth showed on the inside numerous cysts of various sizes, lined with pelvis epithelium and containing a dark red fluid. The bony mass was not uniformly solid, being much more dense in some places and much thinner in others, where, for instance, one of the cysts was separated only by a thin wall from the tissue surrounding the new bone. The ends appeared normal, contrary to those of the control ulna, which evidently had undergone a process of atrophy. There was no osseous union between the ends of the control ulna.

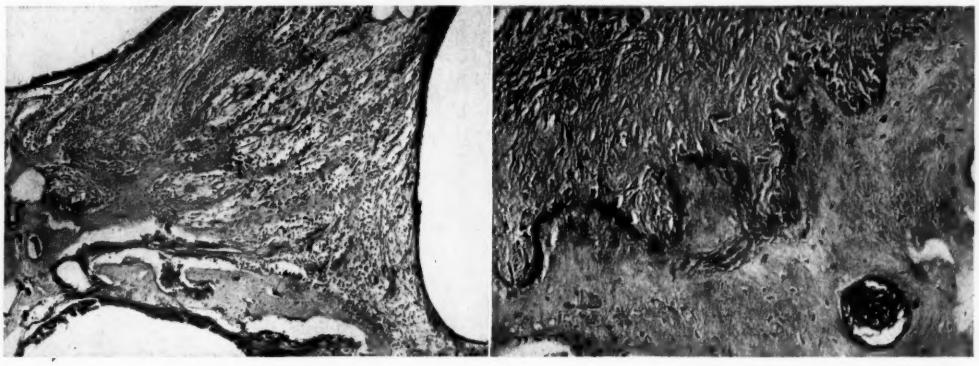


Fig. 6. Left: Intense production of newly formed bone in an area limited by three large cysts lined with the epithelium of the transplanted pelvis. In some places, small cavities, filled with typical medullary elements, are seen in the newly formed bone. Fig. 7. Right: Line of demarcation between the newly formed bone and the mature connective tissue surrounding it. A small cavity on the right contains typical medullary elements.

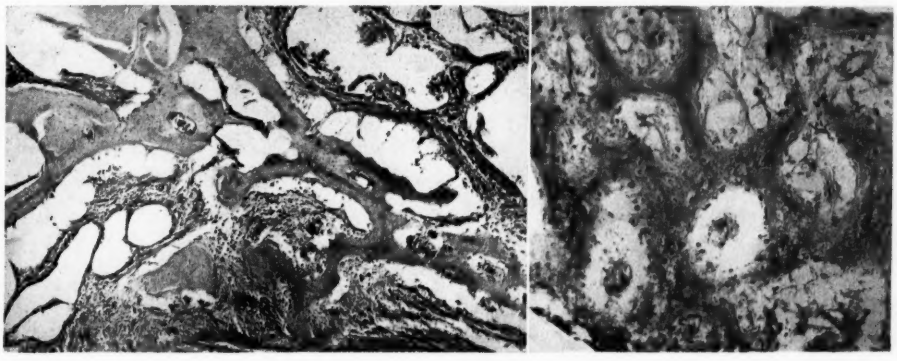


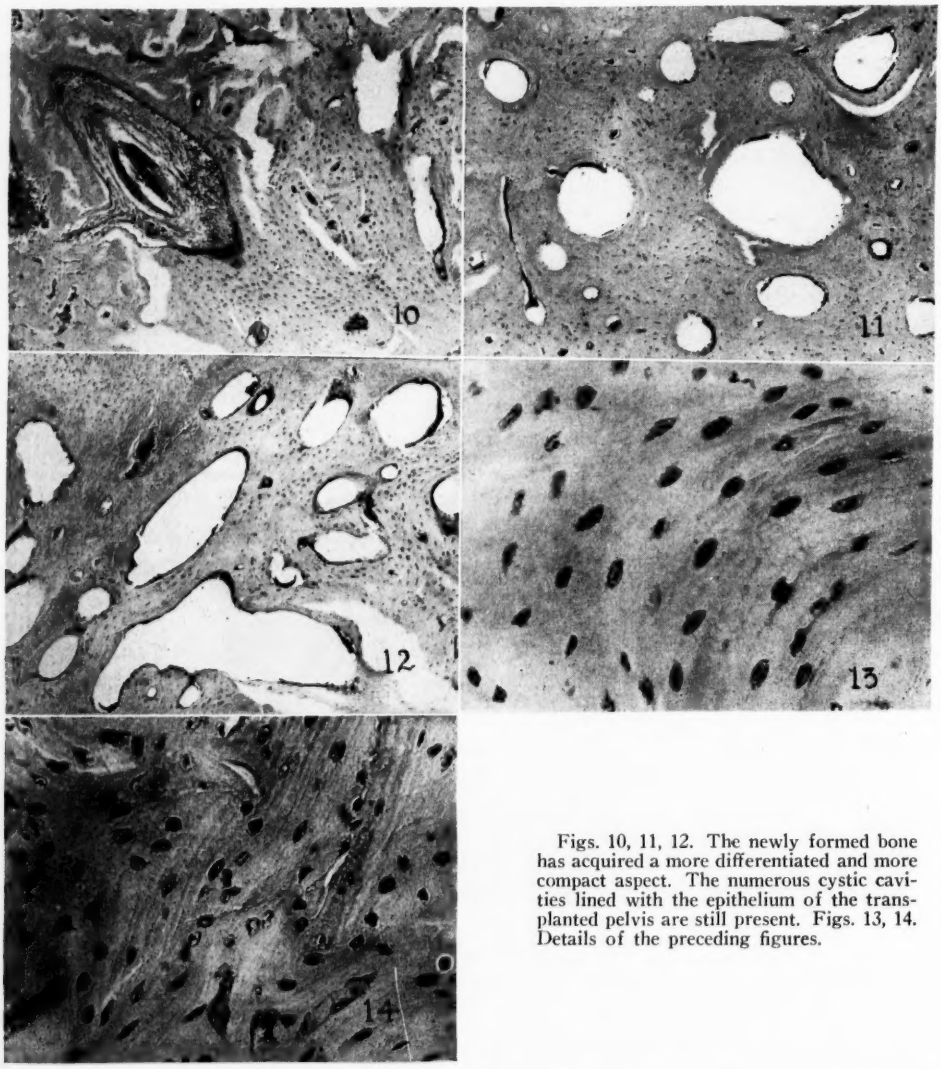
Fig. 8. Left: The newly formed bone delimits numerous small canals, some of which contain typical medullary elements. Fig. 9. Right: The newly formed bone with small cavities containing typical medullary elements. Cystic cavities lined with epithelium of the pelvis.

MICROSCOPIC EXAMINATION

In examining the compact new growth following autotransplantation of the

kidney pelvis, a large quantity of bone tissue in various stages of formation was seen, and also a great number of cysts of different sizes and shapes.

These cysts were surrounded by the bony tissue with its typical Haversian canals and normal-appearing bone marrow (cartilage tissue has never been ob-



Figs. 10, 11, 12. The newly formed bone has acquired a more differentiated and more compact aspect. The numerous cystic cavities lined with the epithelium of the transplanted pelvis are still present. Figs. 13, 14. Details of the preceding figures.

These cysts were lined with epithelial tissue from the pelvis, often atrophic and with tendencies to undergo more or less marked regressive processes. Some appeared to be either empty or filled with amorphous detritus, some of which was dipped in an albuminous, coagulated serum.

served). The newly formed bone appeared to be separated from the walls of these cysts by a thin strip of connective tissue composed of fibers and a few cells of various sizes; sometimes as in the ossification following transplants of kidney pelvis in the liver or spleen, abundant connective tissue sharply separated the

newly formed bone from the peculiar cystic cavities described above.

The newly formed bone grows independently of the periosteum corresponding to the subperiosteal resection of the ulna. This heteroplastic bone grows from the healthy connective tissue originating in the surrounding tissues (bundles of muscular fibers, tendons, aponeuroses, etc.); it inserts itself between the two ends of the resected ulna, filling solidly the defects produced experimentally in the ulna.

CONCLUSIONS

The heteroplastic ossification provoked by autotransplantation of renal pelvis is capable of healing a bone defect 3 to 4 cm. long produced experimentally in the ulna of a dog by means of subperiosteal resection. When pelvis autotransplantation is performed, the ends of resected ulna do not undergo atrophic processes. The newly formed bone solidly uniting the two ends has a tubular shape similar to that of the normal bone and presents internally characteristic cystic-like cavities lined with epithelium. The complete fusion of the two ends of the ulna takes place as a rule three to five months after intervention. The attempt at repair in the bony substance of the control ulna is absolutely inadequate and does not compare with the ossification produced by transplants of kidney pelvis. Even in the case of inconspicuous subperiosteal resection of bony substance, without transplantation of the pelvis, repair is impossible. The presence of a tissue other than the epithelium of the urinary tract (renal parenchyma) does not provoke ossification between the two ends of the subperiosteally resected ulna.

REFERENCES

1. Tosatti, E.: Contributo allo Studio delle Ossificazioni, Eteroplastiche del Rene, Boll. e Mem. Soc. Emil. Rom. Chir. vol. 4, 2, 1937.

2. Idem.: Formazione di Tessuto Osseo nel Fegato e nella Milza da Auto ed Omoinnesti di Bacinetto Renale, Ann. ital. di chir., vol. 16, no. 3, 4, 1939.

3. Leriche: Physiologie et Pathologie du Tissu Osseux, Paris, Masson & Cie, 1939, p. 331.

RÉSUMÉ

L'autotransplantation du bassin du rein pour rémedier aux pertes d'os

Des expériments conduit sur quatre chiens, l'auteur conclut que l'autotransplantation du bassin du rein entraîne la guérison des pertes d'os. Les expériments intéressèrent le cubitus. La présence de tissu autre que l'épithélium du tractus urinaire n'est pas capable de provoquer l'ossification entre les deux bouts d'un os réséqué.

ZUSAMMENFASSUNG

Der Effekt einer Autotransplantation des Nierenbeckens auf die Heilung von Knockendefekten

Aus Versuchen, ausgeführt an 4 Hunden wird die Schlussfolgerung gezogen dass eine Autotransplantation des Nierenbeckens im stande ist einen 3 bis 4 cm. langen experimentell erzeugten Knockendefekt in der Ulna eines Hundes zu heilen. Die Anwesenheit eines anderen Gewebes als des Epithels der Harnwege ist nicht imstande eine Ossification zwischen den 2 Enden des resezierten Knochens zu verursachen.

SUMARIO

El efecto de la auto-transplantación de la pelvis renal en la cicatrización de los defectos del hueso

De experimentos hechos en cuatro perros, se llega á la conclusión que la auto-transplantación de la pelvis renal, es capaz de cicatrizar un defecto oseo de tres á cuatro cm. Un procedimiento largo de experimentación producido en cubitos del perro. La presencia de otros tejídos, ademas del epitelium urinario no es capaz de provocar osificación entre los dos extremos del hueso resecado.

RIASSUNTO

L'effetto dell'autotrapianto del bacinetto renale sul difetto di guarigione delle ossa

Da sperimenti fatti su 4 cani, si è arrivati alla conclusione che l'autotrapianto di bacinetto renale è capace di guarire un difetto osseo lungo da 3 a 4 cm., prodotto sperimentalmente sull'ulna di un cane. La presenza di altro tessuto, eccetto l'epitelio del tratto urinario, non è capace di stimolare l'ossificazione tra le due estremità dell'osso resecato.

Obituaries

Prof. Dr. Fritz de Quervain, Berne, Switzerland.

—o—

Dr. Alfred Bielschowsky, of Hanover, New Hampshire, aged 68, died January 6 at the Jewish Hospital, Brooklyn, following an operation for brain tumor. He was director of the Dartmouth Eye Institute and professor of ophthalmology at Dartmouth Medical School and a member of the New England Ophthalmological Society. Before coming to this country, he was professor of ophthalmology at the University of Breslau, Germany, and a member of the faculties of the Universities of Marburg and Leipzig. He was graduated from the Universitat Leipzig Medizinische Fakultät, Saxony, Germany, in 1894.

Prof. Dr. George Lardennois, Paris, France.

—o—

Prof. Aristide Busi, director of the Institute of Medical Radiology, Rome, died recently at the age of 65 years.

—o—

Prof. Alexandre Besredka, chief of the laboratory of the Pasteur Institute, Paris, died February 28 at the age of 70 years.

—o—

It is with sorrow that we record the death of **Dr. William Eugene Mowery,** of Salina, Kansas, born 1884, died March 7, 1940, Fellow of the International College of Surgeons and member of the editorial board of the Journal of the International College of Surgeons.

INTERNATIONAL OFFICERS

President, Dr. André Crotti, Columbus, Ohio.

President-Elect, Dr. Fred H. Albee, New York City.

Vice-Presidents, Prof. Dr. Rudolf Nissen, Istanbul, Turkey; Prof. Dr. A. Mario Dogliotti, Catania, Italy; Prof. Dr. Alexander Stanischeff, Sofia, Bulgaria.

Treasurer, Dr. William Seaman Bainbridge, New York City.

Acting International Secretary, Dr. Max Thorek, Chicago.

EXTRAPLEURAL PNEUMOTHORAX*

MOSES BEHREND, MD., F.A.C.S., F.I.C.S.
PHILADELPHIA

From the Services of the Philadelphia General Hospital and State Sanatorium, Hamburg, Pennsylvania

THE primary object of all operations for tuberculosis of the lungs is the closure of the cavity or cavities located therein. The ultimate aim of all compressive operations is to render the patient permanently sputum negative. Of great assistance in accomplishing this result is the operation of extrapleural pneumothorax. It was first proposed by John B. Murphy in 1898. At that time it received only a mild degree of encouragement. In the past three or four years, however, with the broadened experience of surgeons in this field, the operation of extrapleural pneumothorax has gained considerable impetus. The operation is still under judgment and the time that has elapsed since its re-introduction has not been sufficient for its ultimate evaluation. However, during the last few years much has been learned concerning the applicability of this operation in cases selected properly for operation.

SELECTION OF CASES

In all operations upon the tuberculous it is most important to select the proper procedure suitable for each individual. Upon this important step depends the success or failure of the operation. It has been our experience that the recent case in which intrapleural pneumothorax could not be established, or was incompletely successful, is the type of case in which the operation of extrapleural pneumothorax gives the most satisfactory results. However, the operation is now being used on selected patients who have had pulmonary tuberculosis for several years and in whom an extrapleural thoracoplasty is inadvisable for various reasons.

Extrapleural pneumothorax offers some hope, often in an apparently hopeless situation, to the patient with contralateral spread of tuberculosis, the patient with low vital capacity, the patient with a large basal cavity which would require a most extensive thoracoplasty, the patient with hemorrhage in whom thoracoplasty may be contraindicated because of spread to the contralateral lung, the patient with rather rapidly progressive lesions which are unchecked by more conservative measures and the patient with bilateral disease.

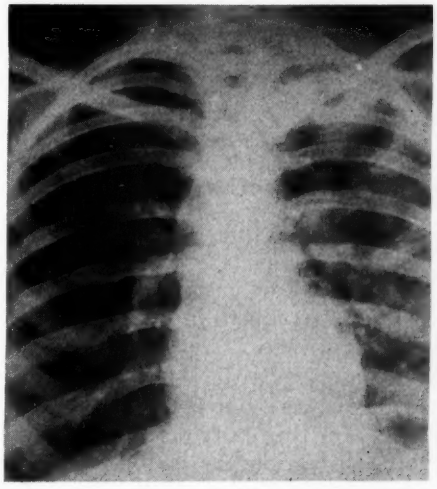


Fig. 1., V.M., age 18. Extensive disease of left lung. Sick about a year before operation. An early case.

We consider as ideal for extrapleural thoracoplasty the patient with a comparatively early and extensive tuberculosis involvement, with or without evidence of some contralateral involvement showing cavitation and localized infiltration about the cavity. In a few

*Read at the Fifth Assembly of the International College of Surgeons, Venice, Florida, February 13, 1940.

cases we have found that it is impossible to maintain to its original full extent the size of the pneumothorax pocket, because of a tendency of the lung gradually to reexpand. While this expansion has never been complete, it may be sufficiently great to allow cavities, closed by the operation, to reopen. In such cases extrapleural thoracoplasty has been performed subsequently. Thus patients who previously were not considered to be fit subjects for this more permanent and extensive operation are enabled to have a thoracoplasty. Cases which have shown negative sputum for months following extrapleural pneumothorax and in whom positive sputum has returned with the gradual reexpansion of the partially collapsed lung, may again be rendered sputum negative by a subsequent extrapleural thoracoplasty (figs. 1, 2 and 3). This may require only one stage or at the most two stages, with the resection of six ribs. We have been unwilling to perform the operation in cases in which the size of the cavity exceeds 4 cm., because in such cases there is great danger of necrosis of the wall of the cavity when its attachment to the chest wall is disconnected. Such a complication must inevitably result in infection of the extrapleural space and the formation of a bronchopleural cutaneous fistula.

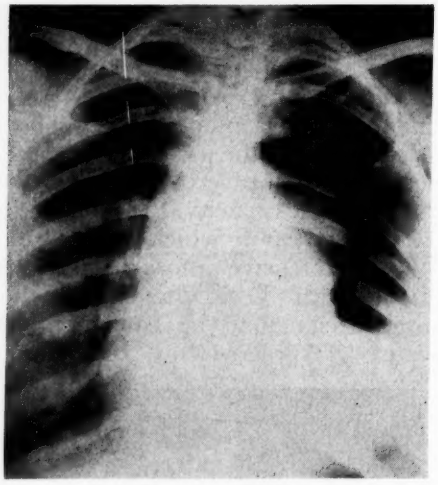


Fig. 2. V.M. Large air space as a result of extrapleural pneumothorax performed August 6, 1938. Negative sputum until March 8, 1939; 10 cm. of fourth rib removed.

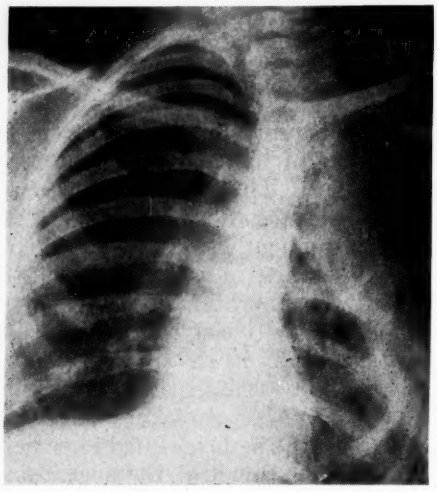


Fig. 3. V.M. Showing two stages of thoracoplasty performed February 21, 1939 and March 28, 1939 for return of positive sputum. Sputum is now negative and disease arrested.

OPERATION

Extrapleural Pneumothorax. The operation consists in removing about 10 cm. of the third or fourth rib anteriorly, posteriorly or laterally after the usual skin incisions are made for a costectomy. For the fastidious individual who wishes to have the scar hidden, a small incision may be made in the axilla. Anteriorly the incision may be made across the third rib, or in women, under the breast. The posterior incision may be a paravertebral one. After a piece of rib is removed the intercostal fascia is separated from the parietal pleura. A line of cleavage is found between these two structures after which the lung is separated within this envelope of tissue and pushed down as far as necessary to obtain adequate compression by means of air introduced into the space which has been left. The operation is facilitated with electrically lighted retractors of Overholt or those used in operations on the brain. Any bleeding points requiring ligation can be seen well within the illuminated cavity. The capillary oozing which always results following this operation helps to cause the compression so desirable in these cases (figs. 4 and 5). Air is introduced the evening of the day of operation, or the following day, after which refills are used two or three times a week. The

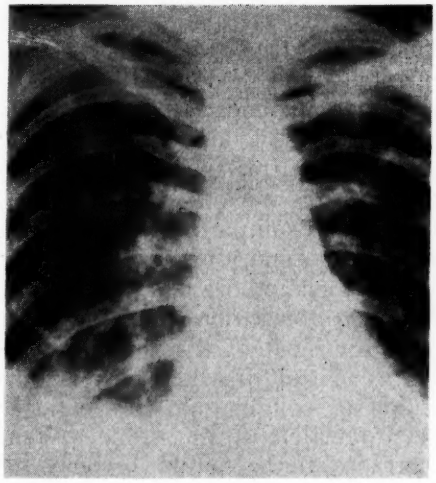


Fig. 4. D.L., age 25. Note small cavity in left lung. A suitable case for extrapleural pneumothorax.

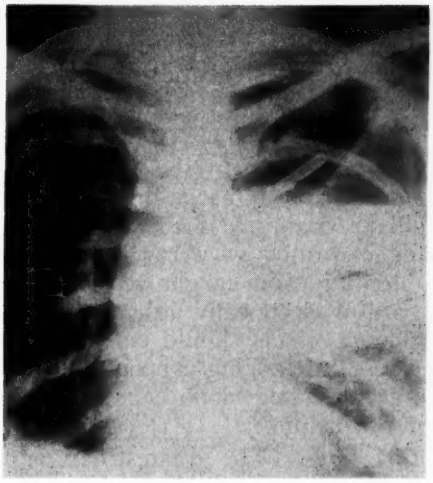


Fig. 5. D.L. One week after operation. Note especially the fluid level due to extravasated blood which is desirable for compression of lung. Air pocket above. About 10 cm. of fourth rib has been removed.

extrapleural space must always be maintained to keep the maximum effect of compression following the injection of air. Some surgeons introduce salt solution after the operation. We have given up this practice because it seemed to encourage infection.

Oleothorax. If there is any indication that the extrapleural pneumothorax space is being lost as a result of reexpansion of the collapsed lung, as an alternative to operation of superimposed extrapleural thoracoplasty or if for any reason thoracoplasty is contraindicated, oleothorax may be employed. It is usually not necessary to consider such a procedure until six weeks have elapsed from the time of the operation of extrapleural pneumothorax. Sterile mineral oil may be used and should be injected gradually in amounts beginning with 5 cc., the quantity being increased gradually when evidence is established that no outward reaction to the oil will occur.

EFFECTS OF EXTRAPLEURAL PNEUMOTHORAX

The type of case which we consider to be desirable for the performance of extrapleural pneumothorax has already been described. Most of our cases have been unsuitable for the operation of thoracoplasty because they were comparatively recent and progressive cases, showing in addition, higher temperature ranges and more rapid pulse rate than is desirable when extrapleural thoracoplasty is contemplated. These cases have all, of course, been positive for tubercle bacilli and many of them had an excessive amount of cough. The operation of extrapleural pneumothorax does not carry with it the immediate operative risk of an extrapleural thoracoplasty and in most cases it is more readily tolerated than the latter operation. Extrapleural thoracoplasty may render the sputum negative, help the patient to gain weight, diminish the cough and generally improve the patient's condition. It should not, however, be considered lightly, and we still feel that extrapleural thoracoplasty is a more desirable type of operation when it can be performed. The danger of infection is much greater following extrapleural pneumothorax as is also the danger of production of a bronchopleural cutaneous fistula. When either of these complications occurs, the prognosis immediately becomes grave. Of this more will be said later.

In three of the twenty-five cases in which we have performed extrapleural

pneumothorax, subsequent thoracoplasty has been done. All of these cases are apparently arrested and sputum negative.

COMPLICATIONS

Hemorrhage. In the separation of the extrapleural fascia there is always capillary oozing. If the separation is made carefully, very rarely will there be bleeding from larger vessels. With the aid of electrically lighted retractors all blood vessels should be caught and tied. A little oozing is beneficial in that the accumulated blood causes compression of the lung.

Infections. The greatest danger following the operation of extrapleural pneumothorax is infection. The blood which has accumulated as a result of the oozing may become infected, or the cavity in the lung, if a thin walled one, may rupture. If infection occurs, the temperature rises and the patients usually become quite sick. When pus accumulates it must be drained. While the space may be lost to a certain degree, sufficient collapse may persist to maintain a negative sputum. Convalescence in infected cases is very much prolonged because, when drainage is instituted, the discharging sinus persists for months.

RESULTS

Since June, 1938, twenty-five cases have been operated upon. Of these six patients (24 percent) died. Four of these died as a result of infection. Two died of hemoptysis. Thoracoplasty was performed on three patients following the primary procedure. The sputum is negative in eleven (44 per cent). In eight cases (32 per cent) the sputum is still positive and further surgery is contemplated.

In the four cases in which infection was indirectly responsible for death, it was necessary to reopen the wound to give vent to a large quantity of pus which had accumulated. One patient was walking around the sanatorium when she was suddenly seized with hemoptysis and died within two hours after its occurrence. Another patient, a rather poor risk, also died of hemoptysis ten days after the operation. One or two stages were necessary to render the patient's sputum negative. It must be borne in mind, therefore, that extrapleural pneumothorax is very often a preliminary operation which contributes to improvement of the patient's condition, as a result of which there is a diminution of cough, gain in weight and the production of negative sputum Therefore, if the sputum becomes positive again and if there is any doubt that the sputum will not remain negative, thoracoplasty should unhesitatingly be advised.

SUMMARY

1. Extrapleural thoracoplasty is reviewed as a method of eradicating tuberculosis cavities in the lungs.

2. The most important consideration is the selection of the proper case for this operation.

3. The technic of operation is described.

4. The most important complications following the operation are hemorrhage and infection.

5. Twenty-five cases have been operated upon, of which six died, eleven have negative sputum and eight still have positive sputum.

DISCUSSION

DR. O. C. SCHLACK (Cook County Tuberculosis Hospital, Oak Forest, Ill.): There is one more point I wish to bring out, and that is maintaining the collapse. We have had great difficulty in maintaining the collapse in the early stages of this operation. At the present time, immediately after the operation, we fill the cavity with normal salt solution, we repeat this six hours later, and then every four hours for the next three days. On the second day the normal salt solution is replaced in the cavity, one half normal salt, the other half air. I believe that if this procedure is followed, we shall maintain a better collapse than we will by just placing air in the cavity, and undoubtedly Dr. Behrend will bring this out.

DR. W. R. LOVELACE (Albuquerque, N. M.): Dr. Behrend did not say anything about phrenectomies in these cases. I am wondering if he believes in phrenectomy before the thoracoplasty is done.

DR. M. M. SIMON (Poughkeepsie, N. Y.): I should like to ask Dr. Behrend what anesthetic he uses, and how often the pleura is entered during the process.

DR. BEHREND: With reference to the injection of salt solution, we have used infusions of salt solution in the pleural cavity following this operation, but believing that it conduces to infection, we have abandoned its use after extrapleural pneumothorax. We perform phreniclasis (temporary paralysis of the diaphragm) by means of crushing the phrenic nerve, in some cases, but do not practice it routinely. Its routine performance is not advisable because in many cases the to and fro movement of the diaphragm is desirable instead of inactivity. In the Philadelphia General Hospital and also in the Sanitarium at Hamburg cyclopropane anesthesia is used. We also use at times local anesthesia, with or without cyclopropane. Except in cases where an intrapleural pneumothorax has been done, we have never entered the pleural cavity in a simple case of extrapleural pneumothorax. I wish to add that in cases of infection, no doubt the cavity in the lung perforated and was the cause of the infection. This is one of the most serious complications following extrapleural pneumothorax.

RÉSUMÉ

Le pneumothorax extrapleural

L'auteur discute la thoracoplastie extrapleurale comme moyen d'oblitérer les cavités tuberculeuses pulmonaires. Il importe de faire un choix judicieux des cas. La technique opératoire est décrite. Les principales complications sont l'hemorrhagie et l'infection. Vingt-cinq cas furent opérés. Il y eut 6 décès; onze à l'heure actuelle ont des crachats négatifs; huits ont des crachats positifs.

ZUSAMMENFASSUNG

Extrapleuraler Pneumothorax

Eine Übersicht über die extrapleurale Thorakoplastik als Methode für die Kollabierung tuberkulöser Kavernen in der Lunge ist angeführt. Das Wichtigste ist die Auswahl geeigneter Fälle für diese Operation. Die Operationstechnik wird beschrieben. Die wichtigsten Komplikationen nach der Operation sind Blutung und Infektion. 25 Fälle wurden operiert, 6 davon starben, 11 hatten negatives Sputum und 8 haben noch immer positives Sputum.

SUMARIO

Pneumotorax extrapleural

Toracoplastia extrapleural es revisada como un método de irradicación de cavidades tuberculosas de los pulmones. La consideración mas importante es la selección de el caso propio para esa operación. La técnica operatoria es descrita. Las complicaciones mas importantes siguientes de la operación son hemorragias é infección. Veintecinco casos han sido operados, de los cual murieron seis, once tienes esputos negativos y ocho aun tienen esputos positivos.

RIASSUNTO

Pneumotorace extrapleurale

Si descrive la toracoplastia extrapleurale come metodo di sradicare le cavità tubercolari dei polmoni. La più importante considerazione è la selezione dei casi adatti per l'operazione. Si descrive la tecnica. Le piu importanti complicazioni dopo l'operazione sono l'emorragia e l'infezione. Venticinque casi sono stati sottoposti ad operazione; di questi sei sono morti, undici hanno espettorato negativo e otto hanno espettorato ancora positivo.

THE MANAGEMENT OF ACUTE PANCREATIC NECROSIS *

LEWIS FREDERIC SMEAD, M.D., F.A.C.S., F.I.C.S.

From the Surgical Division of the Toledo Hospital, Toledo, Ohio

TOLEDO, OHIO

IN the last few years there has been a change in the treatment of the disease known as acute hemorrhagic pancreatitis or acute pancreatic necrosis. Radical surgery is no longer performed as soon as a diagnosis is made. Instead, operative intervention is delayed until the primary shock has disappeared and, if possible, until the patient has fully recovered and careful studies of his case have been made. Frequently, if no biliary disease or residual pancreatic pathology is present, no surgery at all is done. The reports of results obtained with this method of treatment are beginning to show a lower mortality ranging from 50 to as low as 7.5 per cent. This lower mortality is due partly to the fact that patients are not being operated upon during shock or seriously lowered resistance and partly to the fact that greater experience and better methods of diagnosis are bringing to light many mild cases, in most of which recovery occurs. Probably nowhere in the field of surgery is a finer type of surgical judgment required than in the diagnosis and treatment of acute pancreatic necrosis. Indiscriminate and ill-timed surgery leads inevitably to disastrous results.

PATHOLOGY

The pathology of pancreatic necrosis is characterized by certain features, which are directly related to the physiology of the pancreas. They are pancreatic necrosis, due to the action of trypsin, and fat necrosis, the result of the action of lipase. The trypsin by digesting the blood vessel walls adds hemorrhage to the pathologic picture. The secretions from the injured pancreas escape and, mixing with the exudates from the irritated peritoneum, produce the brownish or bloody fluid so typical of the early hours of this disease. Collections of dead pancreatic tissue, blood and necrotic fat, too large to be absorbed, form pancreatic cysts, and when these become infected, pancreatic abscesses develop. Bacteria present in the necrotic pancreatic ducts or escaping through the gangrenous walls of the bowels may produce peritonitis. The whole unusual pathologic picture is due to the escape from the pancreatic ducts of these two ferments, trypsin and lipase. Of these two ferments, trypsin is the more destructive.

Previous to the onset of the necrosis, due to the escape of the pancreatic ferments, there appears a characteristic edema of the pancreas similar to that which is produced in experimental pancreatitis by the injection of irritating substances into the main duct of the organ. This edema must also be considered as a typical pathologic feature of the disease. The above facts are well known, but the problem of acute pancreatic necrosis is, why do these powerful ferments leave their normal habitat and cause such an unusual pathologic picture?

ETIOLOGY AND PATHOGENESIS

The clinical causes usually given as resulting in pancreatic necrosis are trauma, accidental or the result of surgery; hemorrhage into the pancreas from vascular disease or blood dyscra-

*Read at the Fifth Assembly of the United States Chapter of the International College of Surgeons, Venice, Florida, February 13, 1940.

sia; injury to the pancreas by a penetrating peptic ulcer; direct extension of infection from the liver ducts to the pancreatic ducts and pancreas; lymphatic extension of infection to the gland from the gall-bladder and liver ducts; infection from acute systemic diseases; round worm obstruction of the pancreatic duct; and last and most discussed, the theory of the reflux of bile or duodenal contents into the pancreatic ducts. Thus many causes of pancreatic necrosis have been given and each of them at times may possibly be responsible for the disease. Many clinical cases occur, however, in which none of these known causes are present. There is therefore a need of the knowledge of the primary underlying factor, common to all the above causes, which will explain their action.

Obstruction. The work of Rich and Duff[1], published in 1936, has brought out several new principles in the etiology and pathology of pancreatic necrosis. They believe that the common primary cause is a partial obstruction at some point in the pancreatic ducts, behind which, at the time of active digestion, the pancreatic secretions collect under sufficient pressure to rupture the finer ducts or acini and allow the secretions of the gland to escape into the pancreas or surrounding tissues. These writers have shown that this secretion, when it escapes at the highest point in the digestion of a full meal, contains not only active lipase but active trypsin without, however, the help of any activating agent from the intestines or elsewhere. Of course trypsinogen may escape at the same time and become activated by tissue juices. Rich and Duff have further demonstrated that the tryptic ferment, by necrosing the blood vessels, produces a constant and specific lesion in the walls of the arteries and veins, which causes them to rupture and starts the bleeding, from which this disease has derived its name of hemorrhagic pancreatitis. They have also found that the amount of active tryptic ferment present in the pancreatic juice varies greatly, being large at the height of digestion of a full meal and low or absent during the fasting period. It is evident that if the escaping pancreatic juice contains large amounts of trypsin and erodes large blood vessels in the substance of the gland, the hemorrhage and destruction will be great, but if it escapes at the periphery of the organ and comes in contact with small vessels or only with fat, the hemorrhage and damage may be small. Moreover, if the rupture of the duct occurs when the pancreatic juice contains little or no trypsin, fat necrosis only will occur. The well known great variation in the extent and seriousness of clinical cases of pancreatic necrosis would seem to depend upon the amount of the tryptic ferment present in the escaping pancreatic juice and upon the anatomic point at which it escapes.

Once the tryptic ferment is set free, the destructive process progresses automatically. In the pancreas, the walls of the blood vessel are eroded and blood escapes into the substance of the gland, tearing it apart and destroying its nutrition, thus opening up more of the duct system and setting free more of the ferments to continue the disintegration of the gland and the surrounding structures. Thrombosis of the blood vessels also plays a part in the destruction of the nutrition of the gland.

There are many ways, in clinical experience, by which the pancreatic ducts may be obstructed and this disease initiated. The obstruction may be caused by a stone or a round worm within the duct; by a stricture, an adenoma or an inflammation of the duct walls; by a stone, a stricture or a muscle spasm at the lower end of the common duct; and probably by infection and swelling of the pancreas. Rich and Duff have shown that there is commonly present, in the smaller pancreatic ducts, a meta-

plasia or thickening of the duct epithelium which causes a partial obstruction of the ducts with a dilation and thinning of their walls, and that such dilated ducts rupture easily under increased pressure. They found an obstruction of this kind present in the routine microscopic sections in 18.6 per cent of 150 consecutive autopsies performed on persons over 25 years of age and in the routine microscopic sections in 13 of 24 cases of hemorrhagic pancreatitis. They state that it is their "belief that this form of duct obstruction leading to acinar rupture and escape of secretions plays an important rôle in the pathogenesis of many cases of hemorrhagic pancreatitis, though any of the numerous causes of duct obstruction may, of course, lead to the same result."

It is evident that any trauma, accidental or surgical, which might tear the pancreas, or a hemorrhage into the organ due to vascular disease or blood dyscrasia, which might cause a disruption and disintegration of the gland tissue, could set free pancreatic ferments and initiate a case of acute pancreatic necrosis. There is no doubt, moreover, that when a common channel from the common bile duct to the main pancreatic duct has been formed by a stone or a muscle spasm at the ampulla of Vater, bile may, under certain conditions of increased pressure, be injected into the pancreatic ducts with enough force to rupture the smaller pancreatic ducts or acini and set free pancreatic ferments. This seems a much better explanation of how the reflux of bile into the pancreatic ducts might cause pancreatitis than the older one that infected bile, rich in bile salts, starts the trouble by irritating the gland or by activating the pancreatic juice within its ducts. This latter theory is especially lacking in force since we now know that active trypsin and bile are commonly present within the pancreatic ducts. It is probable, however, that the reflux of bile into the pancreas, through a common channel formed by the common bile duct and the pancreatic duct, is only a rare cause of pancreatic necrosis.

The obstruction theory of pancreatic necrosis may, with interest, be compared with obstructive jaundice. In the latter condition we know that the pressure of bile in the smaller bile duct radicles, due entirely to the secretory pressure of the liver cells, causes the ducts to rupture and the bile to escape into the organ without any very serious immediate damage to the liver tissue. If this bile escaping between the liver lobules were rich in active lipase and trypsin, as is the juice from the ruptured pancreatic ducts, one can picture what serious damage would be done to the liver with the coagulation of fat and the erosion of the rich network of blood vessels.

Infection. The rôle of infection in the causation of acute pancreatic necrosis is less clear. Biliary disease is reported as associated with pancreatitis in from 20 to 95 per cent of the published cases. Surgeons generally are convinced that disease of the gall bladder and liver ducts is in some way responsible for their cases of pancreatitis because of the frequency with which they find the two associated, and also because of the fairly common association of pancreatic necrosis and acute biliary disease. However, in a good proportion of the cases of pancreatitis no biliary disease is present and when present it frequently shows no signs of active infection. How biliary infection, as distinct from biliary obstruction, can cause pancreatic necrosis is difficult to explain unless the infection reaches the pancreas, causing edema and inflammation with obstruction of the ducts. There is not much real proof that this is the case. It is to be hoped that future studies of the association of biliary disease with acute pancreatic necrosis will explain their relation.

Pancreatic Edema. Elman[2] and several other authors[3,4] have described an acute lesion of the pancreas, with edema and induration of the organ and evidence of acute inflammation, as shown by fever and infiltration of the interstitial tissues with polymorphonuclear leucocytes, which may be associated with infection from the bile ducts or elsewhere. Some cases show small areas of fat necrosis but no pancreatic necrosis, are acute and severe but tend to subside more promptly than do cases with pancreatic necrosis. The physical findings and laboratory tests, including a high blood diastase, are the same. Many, but not all, of the cases are associated with biliary disease. Obstruction of the pancreatic ducts, reflux of bile into the pancreas and inflammation are given as the pathogenesis.

This condition is said to be much more common than pancreatic necrosis and to represent either a mild form of the latter disease or a distinct entity. It is known as acute interstitial pancreatitis or pancreatic edema. It is undoubtedly a good thing that this mild form of pancreatitis has been emphasized; however, edema of the pancreas is a well known early feature of experimental pancreatitis produced by the injection of irritating substances into the pancreatic ducts, a procedure which produces pressure in the ducts similar to that in obstruction. It would seem, therefore, that all the features of pancreatic edema or acute interstitial pancreatitis might be explained on the basis that it is an early form of a pathologic condition of the pancreas with the same etiology as pancreatic necrosis but in which obstruction of the pancreatic ducts has caused only edema of the gland with some irritation of the interstitial tissue and occasional areas of fat necrosis. The presence of fat necrosis probably indicates acinar rupture with the escape of lipase but no active trypsin. Only the accidental absence of active trypsin would seem to prevent these cases of pancreatic edema from being true cases of pancreatic necrosis. Probably the whole clinical picture of this disease is due to obstruction of the pancreatic duct in which pancreatic edema, hemorrhagic pancreatitis and pancreatic necrosis simply represent different pathologic phases. Of course, cases with edema only should not be called pancreatic necrosis. Finally, it must be emphasized that many mild cases result in prompt recovery in which fat necrosis, hemorrhage and pancreatic necrosis are present in a considerable amount.

Shock in Pancreatic Necrosis. The cause of the profound shock, seen at the onset of pancreatic necrosis, has not been fully explained. It is probably largely the result of the massive and sudden injury to the vital vascular and nerve tissues which surround the pancreas. It has been suggested that it may be due to the absorption of split proteins as the result of tissue digestion. Recently Schmieden[5] has attributed the circulatory collapse to the dilatation of the blood vessels caused by the entrance into the circulation of the liberated trypsin.

DIAGNOSIS

The diagnosis of pancreatic necrosis is not easy. It is not, however, as impossible as it was formerly considered to be. The difficulty has been that the individual physician sees so few cases that he is reluctant to depend upon the rather striking and typical clinical picture when it presents itself. The impossibility of making an absolutely certain diagnosis of this disease, in some cases, is not necessarily a justifiable reason for immediate exploratory laparotomy. If a case seriously suggests upper abdominal perforation, or very acute cholecystitis, and a differential diagnosis cannot be made, operation may indeed be indicated after the circulatory collapse has passed away. However, if such a case, although in serious shock,

shows only moderate abdominal symptoms which are not immediately alarming, operation should certainly not be done and the progress of the case should be watched.

The differential diagnosis of pancreatic necrosis must exclude many acute conditions of the chest and upper abdomen, most important of which are *acute biliary disease, perforation of the stomach, duodenum or gall-bladder, acute intestinal obstruction, ruptured appendix with peritonitis, acute coronary disease, mesenteric thrombosis* and *pneumonia* with shock and severe abdominal symptoms.

The clinical picture and the course of this disease vary greatly. Some cases, showing typical, severe, initial symptoms may progress rapidly downward to a fatal termination, while others with an equally severe onset may recover in a few days. Another group of cases do not show the initial shock and extremely severe pain and can be distinguished from *acute gall-bladder disease* only by the left-sided pain and tenderness and a high blood diastase. The tenderness in pancreatic necrosis is in both sides of the epigastrium, but it is more to the left than in most cases of cholecystitis. In severe cases of acute cholecystitis the tenderness will extend well to the left, but it will also extend farther down on the right side than is usual in pancreatitis. Secretions from a diseased pancreas may, of course, escape from the lesser peritoneal cavity through the foramen of Winslow and flow downward in the right lateral peritoneal gutter at the outer side of the ascending colon and cecum to the pelvis, causing tenderness in the lower right side of the abdomen and in the pelvis. Such cases are often diagnosed as *appendicitis*.

The clinical history and physical findings in typical cases of *hemorrhagic pancreatitis* are quite striking and characteristic. The pain in the epigastrium and back is usually instantaneous in onset, stabbing in character, and very severe. The patient is in shock, is pale, cold and sweating, and has low blood pressure, anuria and persistent vomiting. He may show a dusky cyanosis or more rarely a pink flush over his body with a deep reddish purple in his lips. Frequently he is mentally confused and too tired to answer questions. His temperature is subnormal; his white blood count, blood sugar and blood diastase are high. Jaundice and glycosuria are occasionally present. The early abdominal symptoms are, as a rule, mild in proportion to the severe general picture, but they may later become more severe. A mass may appear in the epigastrium in two or three days or later.

An x-ray examination is at times of help by showing a widening of the duodenal circle or a displacement of the transverse colon or greater curvature of the stomach. It may be of negative aid by revealing free air in the peritoneal cavity, pneumonia or an intestinal obstruction.

A considerable increase in the starch splitting ferment, diastase, above that normally found in the blood and urine is now quite generally recognized as a valuable aid in the diagnosis of the condition. Tests for it are said to have more than doubled the percentage of correct diagnoses. This increase of the diastase is present when the pancreatic ducts are acutely obstructed or when acute damage has occurred in the gland itself. The diastase is probably absorbed from the obstructed pancreatic ducts or injured tissues just as bile is taken up by the blood in obstructive jaundice. It rises rapidly in the blood in the first six to eight hours of the disease and usually returns to normal in 36 to 72 hours. The ferment is increased in the blood also in acute cholecystitis, common duct obstruction, peptic ulcer penetrating the pancreas and in acute inflammation or injury to the pancreas.

The test for diastase consists in de-

termining the amount of sugar produced by the hydrolysis of a starch solution by the diastase in the patient's blood. The test is not too complicated but the laboratory worker does need to have routine experience with it in order to give accurate reports when needed. This experience can be acquired and an occasional unexpected case of pancreatitis discovered if the test is requested, not only when pancreatitis is suspected, but in cases of acute cholecystitis and common duct obstruction. A high diastase in the blood indicates the probable existence of an acute lesion in the pancreas but not the nature or the extent of the process. A normal blood diastase estimated at the proper time is good evidence against acute pancreatic disease.

Another test used in the diagnosis of hemorrhagic pancreatitis is the estimation of the serum lipase. It consists in measuring the effect of the hydrolysis of olive oil by the lipase in the patient's serum. It is a rather complicated test and has not come into common use. According to Comfort[6], who has done considerable work with it, it is a valuable test and has some advantages over the diastase estimation.

It should be emphasized that these tests should not be taken independently but should be given consideration only in the presence of the signs and symptoms of acute upper abdominal disease.

TREATMENT

The treatment of acute pancreatic necrosis may be divided into three phases. The first deals with the disease in the early days of the acute illness; the second, with the later results of the process such as pancreatic abscesses and cysts; and the third, with the prevention of future attacks.

The initial pain of the acute illness must, of course, be relieved with morphine and other sedatives. Blood transfusions and intravenous saline with glucose are useful for shock and vascular collapse. The glucose can be covered by insulin if it is feared that it will increase the secretion and the escape of the pancreatic ferments. Every effort should be made to overcome the low blood pressure with cardiac and vascular stimulants. Vasoconstrictors may be helpful. In case number five of this series the blood pressure promptly returned to normal and the anuria disappeared with the use of small doses of ephedrin on the second day of the illness. Gastric and intestinal distension may be relieved by continuous duodenal drainage. Attempts also have been made to reduce the secretion of pancreatic ferments by withholding food and by the use of atropine in the first few days of the illness.

The controversy regarding the surgical treatment of acute pancreatitis has been concerned with its management in the early days of the disease. There has been much confusion because, at the onset of the trouble, the shock which accompanies many of the milder cases may appear to be as severe as that which is manifested by those which later prove to be very serious. Moreover, it is now realized that the milder cases of pancreatitis are much more common than the severe ones but that they tend to recover promptly in a few days, while the serious cases may rapidly become worse. Surgery, therefore, if applied at the onset to all cases with severe initial symptoms, will result in many unnecessary operations and will increase the mortality of not only the severe cases but also the milder ones. It would seem rational, therefore, to delay surgery in all cases until the initial shock or vascular collapse has disappeared. It will then be found that the milder cases, which make up the large majority, will recover without surgery, while the small minority of serious cases which fail to improve but show increasing local and general symptoms can be treated by surgical or nonsurgical means, according to the

judgment of the surgeon in each individual case. Some of the severe cases will end fatally without recovering from shock; however, such cases will probably not be saved by surgical intervention at this early period.

The general objectives in the operative treatment of acute pancreatic necrosis have been to stop the progress of the disease and to drain away toxic and infectious materials from the abdomen. The surgical procedures used have been decompression of the common bile duct and drainage of the lesser peritoneal cavity after free incision of the pancreas. Of these, only drainage of the pancreas remains unchallenged. The disease in the gall-bladder and common duct is now not so commonly treated at this early stage unless an acute process in these organs accompanies the pancreatitis. Decompression of the common duct to prevent reflux of bile into the duct of Wirsung is also less commonly used because it is believed that the forcing of bile into the pancreatic ducts is only a very rare cause of pancreatitis. Incision into the pancreas itself to promote drainage is dangerous and useless and has been given up by most surgeons.

The immediate objective of surgery, in these more serious cases, has been to drain the lesser peritoneal cavity and thus remove the free pancreatic ferments and necrotic gland secretions, wall off infection, prevent peritonitis and control hemorrhage. Whether the removal by drainage of the pancreatic ferments and broken down gland substances is possible at this early stage of the disease is questionable, but it is a procedure favored by many surgeons. Hemorrhage from the pancreas is rarely in large amounts and in itself does not justify packing of the lesser peritoneal cavity. Infection develops in the necrotic pancreas on about the third or fourth day of the disease in a certain percentage of the severe cases and, while it usually becomes safely walled off in the lesser peritoneal cavity, yet in some cases it is the evidence of such infection which is the strongest argument for operative intervention. No doubt drainage safely established will frequently control this infection and prevent peritonitis. Such a procedure is, however, not without danger, for the opening of the infected area at this early period may spread the infection and cause peritonitis, and the placing of a large tampon into the lesser cavity may introduce infection into what would otherwise remain a sterile field.

Peritonitis, once well established, is not easily controlled by surgery or any other means and must be treated like any case of generalized peritonitis from any other cause.

Schmieden[5], always an advocate of the surgical treatment of pancreatic necrosis, now says (April, 1939) that the more severe types of the disease are rare while the mild cases are rather common and are often masked by biliary disease. It is his opinion that the symptoms of the disease are due to the absorption of the exudates from the pancreas, especially trypsin. He warns against operating during vascular collapse and against incision of the pancreas and random surgery. He advocates that surgical intervention be limited to drainage of the pancreatic area and to the occasional drainage of the biliary tract if the disease is acute. He operates only in the more serious cases of pancreatitis and in severe upper abdominal cases in which a positive diagnosis cannot be made. He believes, very definitely, that the clinical progress of the disease can often be halted by draining away the pancreatic exudates. He states that in advanced cases of peritonitis drainage should be carried out, although little can be done for the condition.

Among the cases which recover from the primary phase of this disease there will be some with collections of necrotic pancreatic tissue, necrotic fat and blood too large in amount to be absorbed.

Such masses tend to enlarge and to be accompanied by fever, leucocytosis, loss of appetite, vomiting and marked loss of weight. Some cases are infected and drainage becomes imperative, while others go on for months to cyst formation. Simple drainage in these cases will usually lead to ultimate recovery.

However, some of these patients pass into a state of asthenia from infection, vomit persistently and finally die, a result which occasionally follows drainage of infected areas of pancreatic necrosis at an earlier stage of the disease.

Once a patient has recovered from an attack of acute pancreatic necrosis, measures must be taken to prevent a recurrence of the disease. Surgeons generally have been impressed with the frequency with which disease of the biliary tract is associated with this condition. In many cases they do not occur together, and certainly there is no real proof other than clinical experience that biliary disease does cause pancreatitis. However, since the association of these two conditions is so common, it is only reasonable that, after the patient has fully recovered from his attack of pancreatitis and careful studies have been made, any pathology of the biliary tract should be promptly corrected. If no such pathology is found, no operation should be performed; the patient should be kept under careful observation and everything done to improve his general condition. If we accept the theory of Rich and Duff, that obstruction of the smaller pancreatic ducts, by a metaplasia of the duct epithelium, is an important cause of pancreatic necrosis, then in many cases the prophylactic treatment by surgery or any other means will probably be ineffectual.

The prognosis in acute pancreatic necrosis should therefore be guarded, but not pessimistic, for the mortality percentage is decreasing and recurrences are not common.

CASE REPORTS

A series of seven cases seen since February, 1936, are here reported. Six of the patients recovered and one died. The pain was severe in all cases. Three patients were in shock and four were not. Five cases might be considered mild and two were of the severe type. In all seven, operation was delayed until the initial severe symptoms subsided. Six cases showed definite gall-bladder disease and the seventh, evidence of pathology on x-ray examination. Operation for correction of the biliary disease was done in all except three cases. One of these patients, with a pancreatic abscess, died after simple drainage; one had very severe hypertension; and one remains to be operated upon. A diagnosis of pancreatic necrosis was made preoperatively in four out of the seven cases. Of the three cases in which a diagnosis was not made before operation, one patient was seen after operation with the operating surgeon; in the other two the diagnosis was missed, probably because insufficient importance was placed upon left sided pain and tenderness and because no blood diastase estimations were made.

CASE NO. 1. Mrs. S. G., age 38. Admitted Feb. 10, 1936.

Diagnosis: Acute cholecystitis, cholelithiasis.

Operation: Cholecystectomy, exploration and drainage of the common duct.

Pathology: Acute pancreatic necrosis of considerable extent and fat necrosis.

History of mild gall-bladder disease since 1928. Stones visualized in 1935. Recently continuous right epigastric distress and tenderness. Onset of present illness, Feb. 9, 1936. Extremely severe, sudden epigastric pain and continuous vomiting. Relief by heavy doses of morphine. Patient pale, dehydrated, quite ill but not in shock. Moderate tenderness in the whole epigastrium. Slightly jaundiced. Temperature was 99, pulse 88, respiration 22, hemoglobin 78, red blood count 4,080,000, white blood count 16,400, with polymorphonuclear leucocytes 97 per cent, blood sugar 99 mg., and icterus index 20. Urine showed a trace of albumin and no sugar. Blood diastase not done. Operation performed Feb. 14, 1936,

with patient in good condition. Stormy convalescence, including fever, high white blood count, much nausea and vomiting. Good recovery with no discharge of pancreatic secretions and no further trouble with pancreatic pathology. Discharged March 16, 1936.

CASE No. 2. Mrs. V. W., age 49. Admitted Feb. 24, 1936. Seen late in illness with operating surgeon.

Diagnosis: Abscess in midepigastrium.

Operation: Drainage of pancreatic abscess.

Pathology: Chronic cholecystitis, cholelithiasis, acute pancreatic necrosis, pancreatic abscess.

History of biliary disease for last five years. Onset of present illness Feb. 3, 1936, with severe boring pain in the epigastrium and back, much nausea and vomiting. Relief by morphine. Gradual improvement until Feb. 23, when she began to show general malaise, fever, soreness and a large mass in the epigastrium. Temperature was 102.5, pulse 120, respiration 20, hemoglobin 68, red blood count 3,580,000, white blood count 20,000. Urine showed trace of albumin and no sugar. Blood diastase not tested. Abscess drained on Feb. 25. Stones in gall-bladder not disturbed. Patient continued with a moderate fever, inability to eat, discharge of large amounts of purulent material. She died in an advanced state of asthenia on April 16, 1936, on the fifty-first day of her illness.

CASE No. 3. Mrs. S. A., age 48. Admitted June 23, 1936. Diagnosis: Chronic cholecystitis, cholelithiasis, and acute pancreatic necrosis.

Not operated upon. History of frequent gall-bladder attacks for years. Onset of present illness, June 23, 1936, with extremely severe epigastric pain radiating to left back, and persistent vomiting. Given one and one-fourth grains of morphine for relief. Patient quite ill but not in shock. Tenderness throughout epigastrium extending well around left costal margin. Pulse 140, temperature 99, respiration 30. Patient dehydrated. Blood pressure, systolic 248, diastolic 116. Weight, 240 pounds. Hemoglobin 114, red blood count 6,020,000, icterus index 20, blood sugar 256, blood diastase 125 (normal, this method 8-16). Urine showed heavy trace of albumin, no sugar. X-ray showed stones in gall-bladder, widening of duodenal circle but no deformity of stomach. Patient recovered completely in 29 days. Operation for biliary disease delayed because of hypertension. Operated upon successfully two years later at another hospital. No note made of pancreas. Discharged July 22, 1936.

CASE No. 4. Mrs. M. K., age 40. Admitted Dec. 18, 1937. Seen in consultation with operating surgeon.

Diagnosis: Chronic cholecystitis, cholelithiasis, acute pancreatic necrosis.

Operation: Eighth day of illness, cholecystostomy and drainage of pancreas.

Pathology: Chronic cholecystitis, cholelithiasis, acute pancreatic necrosis. Pancreas enlarged about six times. Extensive fat necrosis.

Onset of symptoms Dec. 13, with severe pain in epigastrium, persistent vomiting. Patient in moderate shock, could answer questions with difficulty. Moderate, persistent tenderness in whole epigastrium. Temperature 99, pulse 100, respiration 20. Urine showed trace of albumin and no sugar. Blood diastase not tested, icterus index 5, hemoglobin 82, red blood count 5,450,000, white blood count 26,000. Patient in considerable shock from operation on Dec. 21. No drainage of pancreatic secretions on dressings. Patient made a complete recovery, with no recurrence to date.

CASE No. 5. Mrs. B. C., age 22. Admitted Nov. 10, 1939.

Diagnosis: Acute pancreatic necrosis, chronic cholecystitis.

Operation not yet performed.

History of similar but milder attack one month ago. Onset of present illness at 2 a. m. on Nov. 10, 1939, with severe pain in the whole epigastrium, continuous vomiting, weakness and fainting. Tenderness in entire epigastrium, lower right quadrant and pelvic floor. Skin of body showed a pink flush and lips were deep reddish purple. Admitted to hospital at 9:45 p. m. day of onset. Pulse 120, temperature 100, respiration 20. Systolic blood pressure 50, diastolic 5. Urine very scant, albumin heavy trace. Hemoglobin 75, red blood count 4,160,000, white blood count 31,000, segmented polymorphonuclear leucocytes 44, stabs 48, juveniles 5, blood chlorides 595 mg., blood sugar 101 mg., blood diastase 305 mg. (normal 80-150). Shock, low blood pressure (systolic 75, diastolic 40) and anuria continued until the third day when, after small doses of ephedrin, the blood pressure became normal and the urine was secreted freely. Epigastric tenderness continued for 10 days, after which all symptoms were gone. Patient discharged on Nov. 25, 1939, after careful studies had showed poorly functioning gall-bladder. Further x-ray studies were made on Jan. 15, 1940, and as the abnormality still persisted, operation has been advised.

CASE No. 6. Mrs. A. H., age 58. Admitted Nov. 10, 1939.

Diagnosis: Chronic cholecystitis, cholelithiasis, acute pancreatic necrosis.

Operation: Cholecystectomy, exploration and drainage of common duct. Pancreas not drained.

Pathology: Chronic cholecystitis, cholelithiasis, area of acute pancreatic necrosis 2 inches in diameter in head of pancreas, fat necrosis.

History of old and recent gall-bladder disease. Onset Nov. 9, 1939, with sudden, severe pain in epigastrium boring into left back and spine, much nausea and vomiting. Relief by large doses of morphine. Patient not in shock. Soreness in whole epigastrium more marked to left below costal margin; no mass, x-ray visualized gall stone in gall-bladder. Pulse 90, temperature 99, respiration 22. Hemoglobin 87, red blood count 4,410,000, white blood count 15,400, segmented polymorphonuclear leucocytes 63, stabs 26, blood sugar 93 mg., icterus index 11.2, blood diastase 421 mg. in terms of glucose. Urine showed trace of albumin, sugar negative. Operation on Dec. 11 with patient in good condition. No drainage of pancreatic secretions. Good recovery; no recurrence to date.

CASE No. 7. Mrs. J. DuP., age 56. Admitted Jan. 7, 1940.

Diagnosis: Acute cholecystitis, cholelithiasis, acute pancreatic necrosis and deep left-sided pain and tenderness. Diagnosis of pancreatitis depended on very high blood diastase.

Operation: Cholecystectomy. Pancreas not drained.

Pathology: Acutely distended, edematous gall-bladder with stone obstructing cystic duct. Normal common duct with no palpable stones. Pancreas enlarged, edematous, filled with small areas of fat necrosis. No hemorrhages. No free fluid.

History of many attacks of cholecystitis, last one in July, 1939. Onset of present illness was Jan. 4, 1940, while down town. Was able to go home in street car. Severe mid-epigastric pain radiating to back and spine. Relief with one-half grain morphine. Vomited only once after first dose of morphine. Pain of this attack very severe but just like other attacks of gall-bladder trouble and no more severe. Patient in severe pain when seen Jan. 7. Tenderness in whole epigastrium but more marked over gall-bladder and downward. X-ray showed distended gall-bladder filled with stones. Patient quite ill but not in shock. Temperature 100, pulse 90, respiration 22. Hemoglobin 100, red blood count 5,450,000, white blood count 18,500, icterus index 23, pre-operative blood diastase 1,694 mg. in terms of glucose. Urine negative for albumin and sugar. Blood sugar 120 mg. Operation on Jan. 7 because of fear of perforation of gall-bladder. Blood diastase on Jan. 9, 116 mg. and icterus index 7.8. On Jan. 11, diastase 76 mg. and icterus index 6.7. Patient recovered after stormy postoperative period. No drainage from pancreas. No recurrence to date.

CONCLUSION

In conclusion, it would seem that much of the confusion regarding the etiology of this disease would disappear if the obstruction theory of the causation of pancreatic necrosis were accepted as a working hypothesis and if it were considered that the pancreatic edema, fat necrosis, pancreatic necrosis, hemorrhage, suppuration and peritonitis were only different pathologic manifestations resulting directly from the obstruction of the pancreatic ducts and the escape of the pancreatic ferments. Moreover, the controversy regarding the treatment of the disease can be much simplified if operation is delayed until the primary shock has disappeared and the milder cases have been eliminated. The more serious cases which do not show reasonably prompt improvement may then be treated by delay or immediate surgical drainage of the pancreas, as wise surgical judgment may decide.

REFERENCES

1. Rich, A. R., and Duff, G. L.: Bull. Johns Hopkins Hosp. 58: No. 3. 137-211, 1936.

2. Elman, R.: Acute Interstitial Pancreatitis, Surg., Gynec. & Obst. 57: 291-309 (Sept.) 1933. Also, The Diagnosis and Treatment of Acute Non-Hemorrhagic Pancreatitis, Am. J. Digest. Dis. 4: 732-736 (Jan.) 1938.

3. Zoepffel, H.: Das akute Pankreasöden, eine Vorstufe der akuten Pankreasnecrose, Deutsche Ztschs. f. Chir. 175: 301, 1922.

4. Cole, W. H.: Acute Pancreatitis, New Orleans M. & S. J. 90: 351 (Dec.) 1937; and Am. J. Surg. 40: 245-259 (Apr.) 1938.

5. Schmieden, V.: Concerning Indications for Operation in Acute Necrosis of the Pancreas, Chirurg. 11: 274-275 (Apr.) 1939.

6. Comfort, M. W.: Am. J. Digest. Dis. 3: 817-821 (Jan.) 1937.

DISCUSSION

DR. W. R. LOVELACE (Albuquerque, N. M.): Dr. Smead has given a very comprehensive presentation of a difficult and controversial subject, and has emphasized the necessity for conservative therapy.

In a recent review on acute pancreatic necrosis in Japan, Tsuji found that out of a total of 68 patients, only 20 were women, while in the U. S. most cases occur in women. The hospital mortality on 50 patients that were operated on was 18 per cent, in contrast to 8 deaths in the 18 cases that were treated conservatively. Gall stones were found in only one case. In doubtful cases, Tsuji advocated abdominal paracentesis in the left hypochondrium.

An unusual clinical cause of acute pancreatitis was in a case described in 1939 by Fordy, in which the outlet of the ampulla of Vater was completely obstructed by an impacted piece of barley corn. Tsuji presents a point in favor of Rich and Duff's contention, published in 1936, that metaplasia of the epithelium of the branches of the prancreatic ducts leads to partial obstruction, with consequent dilatation and thinning of the acini and ductules behind the obstruction, so that at the time of active digestion the pancreatic secretions collect under sufficient pressure to rupture the finer ducts, thus allowing the secretions of the duct to escape into the pancreas. Tsuji found that the majority of his patients dated the onset of symptoms to shortly after eating or drinking alcoholic beverages.

According to Larson, the absence of bile in the vomitus may be an additional finding of great value in the diagnosis of the presence of ampullar obstruction. If the patient is not vomiting, aspiration of the duodenal contents is a relatively easy procedure and may serve as a means of determining the patency of the common bile duct.

Fallis (December, 1939) emphasized the fact that blood borne infection is a possibility clearly indicated by the occasional development of acute pancreatitis in a patient with mumps. Fully 60 per cent of his series of 26 cases at the Henry Ford Hospital gave a history of previous gastro-intestinal disease. Between 10 and 15 per cent of the patients with acute pancreatitis had either a bluish discoloration of the skin in the flank (Gray-Turner sign) or around the umbilicus (Cullen's sign).

The value of the urinary diastase as an adjunct in the diagnosis of acute pancreatic necrosis has been emphasized by Smythe, as well as Linn and Fallis, on the basis of animal experimentation where acute pancreatic necrosis was produced by the injection of small drops of metallic mercury into the pancreatic arteries at a time when the pancreas was stimulated to the height of its secretory activity. Smythe advocates the use of a modified Wohlgemuth method for the determination of urinary diastase. The urinary diastase begins to rise 6 to 8 hours after the onset of the disease, and usually returns to normal by the end of 72 hours.

As recently emphasized by Boothby, Mayo, and Lovelace, II, postoperative inhalation of 100 per cent oxygen insures a thorough oxygenation of the blood and lungs, thus favoring healing, helps prevent abdominal distention, and combats the development of shock, since it is well known that anoxia of the blood and tissue is a factor of utmost gravity in the production of shock. Transfusion of the blood is given to increase the volume of oxygen-carrying power of the circulating blood and to elevate the arterial pressure. Transfusion and the administration of pure oxygen are a useful combination, both in the prevention and in the treatment of shock. The sooner that shock can be alleviated, the sooner it is possible to operate, and the better is the prognosis.

Approximately 70 per cent of the gas in the intestines is nitrogen. The inhalation of the pure oxygen reduces the nitrogen partial pressure in the lungs to practically zero. As a result, the nitrogen in the blood diffuses into the alveoli and is then expired, since a gas always diffuses from a region with a higher pressure to a region with a lower pressure. In the same manner, the resulting reduced partial pressure of nitrogen in the blood allows this gas to diffuse more rapidly from any body cavity where the nitrogen pressure is comparatively high, such as the intestines.

Continuous suction by the Wangensteen method, through a Miller-Abbott tube, is the best method for intestinal decompression, but great care is necessary to avoid depletion of the chlorides and to maintain a normal blood chemistry. Continuous hot stupes and a rectal tube should always be used.

During the past year and a half, Mayo and Lovelace, II, acting on the results obtained by Fine and his coworkers, have found the administration of 100 per cent oxygen to be an effective adjunct to the above measures in reducing especially severe cases of gastric distention. Administration of oxygen by either the nasal or oral-nasal type of apparatus has proved to be comfortable, efficient, and economical.

I heartily approve Dr. Smead's thesis, which he has so thoroughly presented, and I am in complete agreement with the type of therapy which he has outlined.

DR. C. D. BROOKS (Detroit, Mich.) pointed out that if operations are performed early, in gall bladder diseases, as they ought to be, and the condition is not allowed to go on year after year, a great deal of pancreatitis can be prevented. In his opinion, 90 per cent of the cases of pancreatitis have been accompanied with gall stones. He pointed out that Dr. Smead had covered differential diagnosis extremely well from a clinical standpoint, and added that massive coronary thrombosis, mesenteric thrombosis and pancreatitis are about the only things to consider. He said that cases of acute gangrenous cholecystitis or of massive coronary thrombosis or of mesenteric thrombosis or of acute pancreatitis are not relieved by one hypodermic, although in almost every other disease entity relief is obtained by a hypodermic of one quarter, repeated perhaps in a couple of hours. The pain is not colicky; it is achy and dull in character. In his experience most of these cases of acute pancreatitis have been followed by gall bladder disease. He agreed with the essayist that when patients are admitted to the hospital with symptoms of shock, they should not be operated upon until their condition is improved. For more than two years he has treated all his cases with oxygen upon entrance to the hospital. Lividity of the cheek and lipase are among the important diagnostic factors. As additional treatment, massive stupes are placed over the entire abdomen. These are six inches thick and extend from the chest to the pubes and around the back; they are held in place with a binder. The patient is then given 100 per cent oxygen; for the last year and a half a large dose of sulfanilamide has been given; in every case the Miller-Abbott tube is used; duodenal drainage relieves the duodenum of the secretion, and this at times seems to relieve the patient. Through this tube a normal two per cent saline solution is given to overcome dehydration. All patients are given blood transfusions; a small amount of blood given at one time (350 cc. twice a day) is preferable to one massive transfusion. After the circulation has improved and the pulse rate has fallen to around 100 and some of the cyanosis has disappeared—a condition which is often produced by the administration of morphine, heat, suction, blood transfusions and glucose intravenously—operation is advised. The operation, done under spinal anesthesia given in small

amounts, consists only of inserting soft drains with an inch tube in the gall bladder. The pancreas should not be touched. The wound is left open and covered with a voluminous pack, an enema is given in the afternoon and deep x-ray therapy is applied.

DR. S. L. GOVERNALE (Chicago): Someone made the statement that patients die occasionally, not so much of the disease as of the treatment. Too much therapy is often harmful. I fail to see the rationale of applying heat therapy to a patient who has already a collapse of the splanchnic area. Physiologically that area contains practically two-thirds of the vascular supply, and if the patient is in collapse one naturally must deduce that there is a great volume of blood, and it seems to me that heat attracts more blood to that particular area than should be there. I should like to ask the essayist about the treatment of complications, such as disruption of the abdominal wound by the action of the trypsinogen and trypsin. It seems to me that most of our trouble has been in the treatment of the sequelae. There is one more unusual sequela that has not been mentioned, and that is duodenal ileus. Abel, Bell, Judd and Puestow a few years ago presented a number of cases with acute pancreatitis that developed duodenal ileus. It is easy to see how this thing can happen, as the pancreas increases in size due to its inflammatory process, the thickness of it pressing not only upon the pedicle of the superior mesenteric vessel, but also upon the duodenal wall. I have met that particular catastrophe in one case where there was concomitant infection to the pancreas as well as duodenal ileus.

I should like to be advised as to the procedure in that particular case, namely, one in which there are two sequelae to contend with, one the pancreatitis, and the other the duodenal ileus. It seems to be a common procedure in most of the acute pancreatitis cases that the head of the pancreas as well as the liver bed must be decompressed, and I think that common duct drainage or choledochostomy should be the procedure in most of the cases.

DR. SMEAD: I personally am not convinced of the value of decompression of the common duct because I believe that while obstruction is an etiologic factor, nevertheless the obstruction of the common duct by the duodenum and the backing up of the bile into the pancreatic duct is probably only a rare cause. Rich and Duff pointed out that in metaplasia of the duct the obstruction is more likely to be high up, in the smaller duct. Clinical experience for years showed that a round worm climbing up into the pancreatic duct has caused obstruction and pancreatitis; there are some 50 such cases in the literature. As to dealing with the gall bladder and the removal of stones, I think that is all right provided the condition is acute at the time; otherwise I feel that drainage of the lesser peritoneal cavity is all that should be done. Incision of the pancreas, I believe, is a mistake. It is dangerous. There is serious danger of hemorrhage. The pancreas itself is soft, and I do not believe that the secretions have much difficulty in getting out. Duodenal ileus I have tried to combat simply by the use of a duodenal tube and drainage. I believe that sometimes there is even more than a duodenal ileus. I have seen one case in which there was actually pyloric obstruction. You have all seen, I presume, pyloric obstruction in carcinoma of the pancreas. That has happened in my experience several times. The only hope here is correct drainage. Rupture of the wound in these bad cases, with drainage of a considerable amount of trypsin, of course, is bound to occasion a serious condition. I suggest sewing them up with wire and probably repair of the hernias later. I have discussed treatment of collapse. I have only one suggestion to make, based on an experience in a recent case. The patient was in tremendous vascular collapse. I gave ephedrin, small doses every four hours, as in spinal anesthesia; the blood pressure rose promptly, the anuria disappeared and the patient improved. Whether that was a coincidence I do not know, but it is a thought, at least, and the procedure is harmless. As to gall stones, I think we are all impressed with the relation of gall stones to pancreatitis. I am, because at least 95 per cent of these cases have been associated with gall bladder disease, and quite a number of them with acute disease. However, in several of them there has been nothing acute at all. I believe if the condition is acute it should be dealt with along with the other conditions. The thing I wish to stress is that operation should not be performed in the acute stage. In most of those cases within a week or ten days the patient is well, almost ready to leave the hospital. If we can differentiate those cases and allow them to recover without surgery, many patients will be saved that would otherwise have succumbed to surgery. Had I operated in the case cited in which ephedrin was used, the patient would have died. I believe she is well today. While Rich and Duff believe that not over 20 per cent of the cases are associated with gall stones or biliary diseases, my experience differs from their conclusions.

RÉSUMÉ

Le traitement de la nécrose aiguë du pancréas

Le mortalité de cette condition a été diminuée et par le traitement conservateur et par le diagnostic précoce. La théorie que la maladie est due à l'obstruction et à la rupture des conduits pancréatiques et au déversement dans le pancréas de lipase et de trypsine nous guide dans le traitement. Afin de ne pas opérer inutilement, on retardera l'intervention jusqu'à temps que le malade soit remis du choc et que les cas bénins soient éliminés. Les cas graves seront opérés.

ZUSAMMENFASSUNG

Die Behandlung der akuten Nekrose des Pankreas

Konservative Behandlung und die Einschliessung vieler milder Fälle dank der besseren diagnostischen Methoden haben die Mortalität dieser Krankheit stark herabgemindert. Eine vorläufige Hypothese wird in der Theorie gefunden, dass die Krankheit eine Folge der Ruptur der Pankreaskanäle mit Extravasat der Lipase und des Trypsins in

die Gewebe ist. Um unnötige Operationen zu vermeiden sollte erst operiert werden wenn der Shock verschwunden und ein milder Fall ausgeschlossen ist. Die schwereren Fälle die dann noch keine Besserung aufweisen können operativ behandelt werden.

SUMARIO

Procedimiento à seguir en la pancreatitis necrótica aguda

Tratamiento conservativo de la pancreatitis agúda con necrosis y la inclusión de muchos casos lijeros debido á mejores métodos de diagnóstico han reducido la mortalidad de esta enfermedad. Una hipotisis para la base de la etiología es encontrada en la teoria de que la enfermedad es debida á la obstrcción y rotura del conducto pancréatico con el escape dentro de el pancreas de lipasas y tripsinas. Para evitar cirugía innecesaria la operación debe de ser retardada en todos los casos hasta que el shock haya desaparecido y los casos lijeros han sido eliminados. Los casos mas serios los cuales no muestran mejoramiento pueden ser tratados entonces con cirugía.

RIASSUNTO

Maneggio della necrosi acuta del pancreas

Trattamento riservato dei casi di necrosi acuta del pancreas, e l'addizione di molti casi lievi dovuti a migliori metodi di diagnosi, hanno ridotto la mortalità di questa malattia. Una possibile ipotesi per l'etiologia si trova nella teoria che il morbo sia dovuto ad una ostruzione e rottura dei canali pancreatici con fuga di lipase e tripsina nel pancreas. Per evitare chirurgia superflua, l'operazione dovrebbe essere differita in tutti i casi fino a che lo shock si sia calmato e i casi lievi siano stati eliminati. I casi piu gravi i quali non dimonstrano alcun miglioramento possono essere operati.

E. B. Krumbhaar has been chosen president of the College of Physicians of Philadelphia for 1940. **O. H. Perry Pepper** was elected vice-president; **J. Harold Austin,** secretary; **John B. Flick,** treasurer; **A. P. Brubaker, Charles W. Burr, Francis R. Packard** and **John H. Gibbon,** censors; and **Robert H. Ivy** and **T. Grier Miller,** incoming councillors.

—o—

New officers of the Pathological Society of Philadelphia, elected January 11, are: **Dr. Jefferson H. Clark,** president; **Dr. R. Philip Custer,** vice-president, and **Dr. Herbert L. Ratcliffe,** secretary-treasurer.

—o—

Lectures were given in the medical centers of Argentina by the following: **Professors Rovenstine,** New York (anesthesia); **Grey Turner,** London, (surgery); **G. Marañón,** Madrid; **G. G. Voronoff**, Paris, and **George Harrop.**

—o—

Dr. Eldridge L. Eliason, professor of surgery, University of Pennsylvania, and **Dr. Frank H. Lahey,** Lahey Clinic, Boston, will present a symposium on "Cholecystitis and Cholelithiasis With and Without Jaundice" under the auspices of the Section on Gastroenterology of the Medical Society of New Jersey at Haddon Hall, Atlantic City, on June 5, 1940. This session will be held in connection with the one hundred and seventy-fourth annual meeting of the Medical Society of New Jersey. **Dr. Hyman I. Goldstein,** of Camden, N. J., is chairman and **Dr. Carroll Deane Smith,** of Paterson, N. J., is secretary of the Section on Gastroenterology.

HETEROGENOUS BONE GRAFTS

MIGUEL LOPEZ ESNAURRIZAR, M.D., F.I.C.S.

Member of the Academia Mexicana de Cirugia

MEXICO CITY, MEXICO

THE principal object of this work is to call attention to the indications and advantages from the use of properly prepared dead bone used instead of autografts.

PHYSIOLOGY OF OSTEOGENESIS

It would not be possible to treat in this article the problem of the biology of bone grafts, because of the obscurity that still surrounds it. Nevertheless it seems that no fragment of bone, dead or alive, of homoplastic origin, is capable of continuing its life unchanged. It always suffers a profound modification by the surrounding tissues. The Haversian canals and all other spaces are progressively invaded by young connective tissue; later on, the calcareous bone substance is absorbed to be replaced entirely by new bone. It is possible that in living bone graft transplants, some transplanted living cells may continue to develop, but most of them disappear and are replaced by new cells derived from the surrounding tissues. Undoubtedly the grafts have mechanical functions (sustaining and refilling), chemical functions (as a source of mineral salts in situ), morphological functions (the bone canals serving as guides to the medullary cells, promoting the formation of new bone within the graft) and perhaps, a biological function, stimulating osteogenesis; this is more energetic in autografts or homoplastic grafts than with dead bone. Whether the graft is completely reabsorbed is perhaps of little importance if the same is opportunely replaced by new bone.

The evolution of grafted bones, seen radiographically, discloses that after some time the respective shadows become clear, reduced and finally disappear, as if invaded by new bone tissue. Leriche and Policard's theory is that of calcium mutation, i.e., bones during life undergo perpetual recomposition, sometimes becoming decalcified and at other times recalcified, according to organic necessities. In new bone formation, calcium phospate substances, dissolvable by osteolysis, are necessary in the surrounding tissues. A bone graft suffers immediate lysis or partial destruction of its structure, being attacked by the surrounding tissues. By a mixed phenomenon of lysis and osteoclasis, the walls of the bone are progressively attacked; a process of repair and reconstruction soon follows.

ROLE OF PERIOSTEUM

Is the osteoblast a specific element of particular osteogenetic value, or is it a modified form of a fibroblast? Lexter taught that the periosteum and medulla are the only tissues of the adult from which bone tissue can be formed in a direct manner. Leriche and Policard, on the other hand, believed that all young connective tissue, if circulatory conditions are not favorable, may be ossified. For bone formation, it is sufficient to provide the necessary mineral materials. A transplanted graft serves as a guide and as a resevoir providing calcareous salts.

One of the most discussed points is the rôle played by the periosteum in osteogenesis. Some authors believe that new formation of bone springs exclusively from the osteogenetic cells of the periosteum, and they accord a secondary

rôle to the medulla and endostial elements. Other authors, on the contrary, ascribe to the periosteum no osteogenetic function. New bone formation is produced, they believe, at the expense of the grafted bone cells; still others maintain that bone formation results exclusively from the graft.

Leriche and Policard, contrary to the traditional doctrine of Ollier, studied the osteogenetic function of the periosteum. They say that the periosteum is nothing more than a fibrous membrane surrounding the bone, no cell layer existing between both. If the periosteum, when separated, forms bone, it is only because there were withdrawn with it some microscopic bone elements that remained adherent to its inner wall; the periosteum constitutes a connective tissue easily undergoing ossification, the bone granulations providing the indispensable calcium materials. Albert maintains that all young or renewed tissues can be ossified under certain favorable conditions if bone is provided. Bone forming cells are found in the periosteum, and the presence of phosphorous and calcium salts in the general economy suffices to generate bone; the periosteum need not be near a bony or calcareous deposit.

Two practical conclusions may be drawn: (1) Periosteum is capable of producing bone without the presence of nearby calcium deposits; (2) bone without its periosteum or dead bone surrounded by young connective tissue is capable of being transformed into living bone tissue. Therefore one is justified in using as the same "graft" a dead bone transplant properly prepared and conveniently placed on a bed of young connective tissue.

LIVING VERSUS DEAD BONE GRAFTS

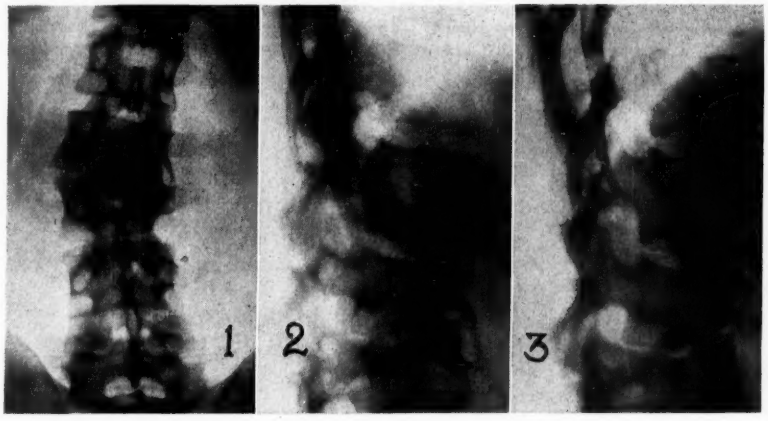
It is universally admitted that living autoplastic grafts become better adapted to the patient than dead bone grafts; the former, protected by the periosteum, possesses the more marked osteogenetic attributes, and in any event, the bone graft acts as a foreign body, preventing the bony ends from remaining separated and the intervening space from being filled by connective or scar tissue, thus frustrating attempts at osteogenesis. Contrary to nonabsorbable bodies, quickly embodied bone transplants through their inherent qualities soon come into close association with the surrounding tissues. In recent years the superiority of living grafts over dead grafts has been questioned.

Dead bone, the use of which is credited to Waldenstrom and Svante Orell, is said to be better than other materials; it is devoid of soft tissues and therefore allows easier penetration. In some clinics (Leriche's, etc.) "os purum" has been widely used. I have used it extensively in my clinic. I have gained the impression that in many cases of pseudoarthrosis and vertebral grafts the os purum, when conveniently placed, grows again, and lives as long as a living autograft. Porous bone grafts are the best of all types of grafts for transplantation. The extraordinary speed with which a bony cavity filled with "os purum" becomes covered with sound bone is really surprising. One may say that the "os novum" derives its nourishment from os purum placed under the periosteum. Once the os novum is transplanted, it is more easily incorporated than grafts that have not been previously prepared. It has not been demonstrated that partially revived os novum is viable bone. According to Orell, young bone fragments are absorbed, the soft tissue remaining alive.

If bone grafts act as splints and as sources of supply of phosphorous and calcium salts, dead tissue grafts must give results identical to those of living bone tissue (autografts) or those of revived bone (os novum).

USE OF OS PURUM

Os purum is prepared from fresh bones obtained by surgical amputations or from bones coming from the abattoir, especially ox bones. Orell's technic of preparing these follows:



Figs. 1, 2 and 3. Roentgenograms of lumbar spine of Mr. A. B. Figs. 1 and 2, anteroposterior and lateral views, respectively, taken June 2, 1929, before operation. Fig. 3, lateral view, taken Aug. 20, 1939, 2½ months after operation.

The soft tissues are first removed mechanically. Their albuminoid substances, especially the blood albumins, are extracted by means of a protracted bath in saline solution. Next decalcification is accomplished by treating the bones with caustic potash, lye, and lastly, the grease is removed by acetone. The bone is then carefully washed and preserved in a dry state. The bone thus obtained for grafting is a dead bone deprived as much as possible of its organic components.

The os purum constitutes the most favorable form of dead grafts; it is tolerated perfectly, for its empty canals are admirably adapted to rehabitation. Generally, porous bone is more readily and easily absorbed than compact bone, which is resorbed with difficulty, but on the other hand, the former is more brittle; therefore, in every case, the most adequate bone must be selected, according to the particular necessities.

In order to supply vital elements to the os purum, Orell places it under the periosteum from four to eight weeks. It is then extracted, partially rehabilitated and surrounded by a newly formed soft and elastic connective tissue in the beginning stages of ossification. The site of election for transformation of this os purum is underneath the periosteum of the inner surface of the tibia. According to Orell, os novum insures osteogenesis, thanks to the living periosteal tissue in ample proliferation. The survival and incorporation of these tissues in the bed of the graft is the *sine qua non* of success. It is essential to fix the transplanted graft tightly to the ends of the bone, creating intimate contact with these, without permitting mobility of any kind. The graft must penetrate deeply into the receptor tissues in order to obtain perfect union. A persisting sliding movement stimulates the connective tissue to mature rapidly, to which extent it interferes with osteogenesis. The receptor tissues must be in a healthy condition. Os purum grafts depend upon the osteogenetic properties of the tissues at the site of implantation. It is essential that no violent trauma occurs. Orell insists upon the necessity of taking great care of the bone, the periosteum and the medulla whence the first relations with the new bone will arise. According to Orell, also, the success of an os purum graft depends upon carefully

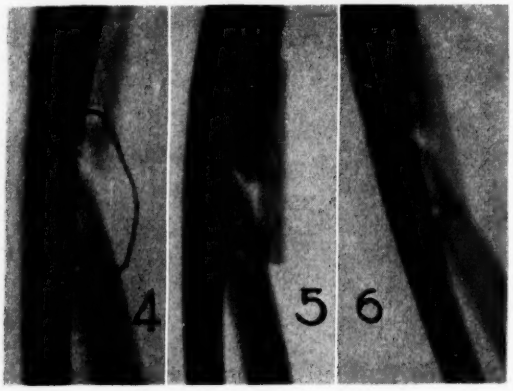
placing it within specifically osteogenous sound tissues.

AUTHOR'S EXPERIENCE

At our clinic in Mexico City, we have performed some operations with heterogenous os purum grafts that were prepared under our personal direction. We prefer to use these grafts instead of the os novum grafts because of greater ease of technic. Patients operated on in this manner experience less pain and we believe that os novum offers no advantages over os purum.

Tuberculous Spondylitis. In these cases (Pott) we have performed the classical operation of Albee, placing the graft deep into the split spinous processes; rarely do we resort to lateral spinal graft at the sides of the spinous processes. Figures 1, 2 and 3 are in point. They represent roentgenograms of Mr. A. B. and show the lumbar spine before (June 2, 1939) and after (Aug. 20 of the same year) Albee's operation, depicting the graft in its place. This patient has shown an excellent tolerance towards the grafted bone. The operative result was entirely satisfactory.

Os Purum Graft in Pseudoarthrosis. I present the roentgenograms of Mr. A. M., who suffered a subcutaneous fracture of the right radius at its middle third. Osteosynthesis with silver wire was performed by another surgeon, which failed; pseudoarthrosis developed; the patient also presented an intolerance to the silver wire. Pronation and supination were excrutiatingly painful and the ends of the bone were becoming decalcified. We inlaid a small bar of os purum. The result was: disappearance of pain on motion; the recovery of most of the movements of the forearm, especially pronation and supination. The roentgenograms in Figures 4, 5 and 6 were taken before and after the operation.



Figs. 4, 5 and 6. Roentgenograms of right radius, middle third, of Mr. A. M. Fig. 4, nonunion of bone following osteosynthesis with silver wire (still in place), with pseudoarthrosis. Fig. 5, "os purum" graft in place following removal of silver wire. Fig. 6, absorption of "os purum" has occurred and function of arm is almost wholly restored.

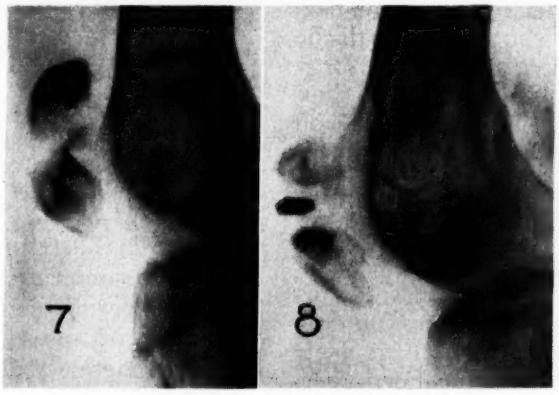
Graft in An Old Fracture of the Patella. Mr. F. J. had a comminuted fracture of the patella. An os purum graft was done, as can be seen in Figures 7 and 8. The results were excellent.

INDICATIONS FOR USE OF OS PURUM

Indications for the use of os purum grafts are exceedingly numerous. This material may be used to fill the holes in the skull following trephining. This

has been suggested by one of my pupils, Dr. Miguel Arroyo.

I doubt whether os purum grafts really should be designated "grafts," because dead bone cannot be revived; nevertheless, the work they perform (mechanical, refilling, chemical and biological) is extremely efficient, they are tolerated well and readily reabsorbed. They really work as "grafts" and constitute the best prosthetic material in osteosynthesis. Especially is this true because of their perfect tolerance. While grafting os novum is much more efficient than grafting with os purum because of the ease with which the former can be used, the latter is superior because of lessened trauma suffered by the patient (only one operation is performed instead of two) and the saving of time, because transformation of os purum into os novum takes four weeks.



Figs. 7 and 8. Roentgenograms of patella of Mr. F. J., which had undergone a comminuted fracture. Fig. 6, before operation. Fig. 8, after graft with "os purum."

SUMMARY

The term "heteroplastic" graft signifies the use of animal bone fragments in man, as contrasted with the "homoplastic" grafts, taken from the same person, generally from the inner surface of the tibia. The author, following the rules of Svante Orell, after properly preparing fresh bones obtained from the abattoir, applies them in those conditions where bone grafts are indicated. The results from this method are gratifying. Moreover, the patient is spared the operation for removal of healthy bone for the graft. In this procedure, the first operation becomes unnecessary. Besides this, fragments of varying size and shape are available. Illustrative cases are cited.

A bibliography of 75 references will be found in the reprints.

RÉSUMÉ

Les greffes osseuses hétérogéniques

Le terme "greffe hétéroplastique" signifie l'emploi de fragments osseux animaux chez l'homme. Pour désigner les greffes prises sur le sujet même, on emploie le terme "greffes homoplastiques." L'auteur obtient les greffes hétéroplastiques des abattoirs et les applique selon les règles. Les resultats de cette méthode sont satisfaisants. Un des avantages de la methode est qu'elle dispense de l'emploi de greffes d'os normal prises sur le sujet même. Dans cette intervention, la première opération est inutile. Des fragments de forme et de volume variables peuvent être employées. Des cas sont rapportés avec illustrations.

ZUSAMMENFASSUNG

Heterogene Knochentransplantate

Der Ausdruck heteroplastisches Transplantat bezeichnet die Benutzung eines Tierknochenfragmentes auf einen Menschen, zum Unterschied von homoplastischen Transplantaten wobei das Transplantat von der selben Person herstammt, meistens von der Innerfläche der Tibia. Der Verfasser, nach sorgfaeltiger Vorbereitung von frischen Knochen von abattoir nach Regeln von Swante Orell, wendet sie an wo immer die Transplantate indiciert sind. Die Resultate sind dankbar. Umsomehr, da dem Patienten die Entfernung eines gesunden Knochenstüskes für Transplantat erspart wird. Durch dieses Vorgehen wird die erste Operation unnötig Ausserdem sind dadurch Fragmente verschiedener Grösse und Form herstellbar. Illustrative Fälle werden geboten.

SUMARIO

Injertos de huesos heterogeneos

El termino injerto "heteroplástico" significa el uso de fragmentos de hueso animal en el hombre, contrastado con el injerto "homoplastico" tomado de la misma persona, generalmente de la porción interna de la tibia. El autor siguiendo las reglas de Svante Orell, despues de propiamente preparar hueso fresco obtenido del matadero, los aplica en esas condiciones donde injerto de hueso está indicado. Los resultados de este método son alentadores. Ademas, el enfermo no sufre la operación de extracción de hueso sano para el ingerto. En este procedimiento, la primera operación se hace innecesaria. Varias formas y medidas de fragmentos de huesos estan á nuestra disposición. Casos ilustrativos son citados.

RIASSUNTO

Trapianto osseo eterogeneo

Il termine "eteroplastico" significa l'uso di frammenti ossei di animali nell'uomo, per distinguerlo dal trapianto "omoplastico", preso dalla stessa persona in generale dalla regione anteromediale della tibia. L'autore seguendo le prescrizioni di Svante Orell, di preparare ossa di animali ottenuti da un macellaio, gli applica in condizioni nei quali un trapianto è indicato. I risultati di questo metodo sono buoni. Di più il malato risparmia una seconda incisione per la rimozione del trapianto, perchè qui questa non è necessaria. Pezzi di osso in diverse formi possono essere conservati. Casi illustrativi sono citati.

APPLICATIONS FOR ASSOCIATE MEMBERSHIP, MEMBERSHIP AND FELLOWSHIP IN THE INTERNATIONAL COLLEGE OF SURGEONS MAY BE ADDRESSED TO DR. CHARLES H. ARNOLD, 908 TERMINAL BUILDING, LINCOLN, NEBRASKA. THESE WILL BE ACTED UPON IN THE REGULAR ROUTINE AS OUTLINED IN THE BY-LAWS. APPLICATIONS FOR CONSIDERATION MUST BE RECEIVED NOT LATER THAN A MONTH PRECEDING THE REGULARLY STATED ASSEMBLY MEETING.

IMPORTANCE OF AIR WAY IN ANESTHESIA

V. O. CARDENAS, M.D.
CHICAGO

AN unobstructed air way is one of the fundamental principles on which the administration of an inhalant anesthesia is based. If the air way is perfectly clear, the anesthetic is brought into contact with all the internal walls of the alveoli. It is obvious that the anesthetist must constantly bear in mind the importance of a clear air way. Advancements in the discovery of different kinds of anesthetics should not exceed the knowledge of their application to the patient.

The importance of the air passage forces us to consider the study of the ventilation of the lungs according to the anatomic divisions of the respiratory tract, and for this purpose it can be divided into nasal, oral, pharyngeal, laryngeal, bronchial and alveolar passages. Each anatomic portion should be considered separately.

CAUSES OF OBSTRUCTION

The nasal and oral passages can be kept clear with a simple nasal or oral air way which can be inserted whenever necessary. Some difficulties may be encountered in inserting an air way in the nose, if hypertrophic turbinates with firm bone structures are present, or in the oral passage, if the muscles of the jaw are rigid. The pharyngeal passage may be obstructed by various means—relaxation of the tongue, vomiting, mucus, etc. The tracheal passage may be obstructed by plugs of mucus, particles of food aspirated from the stomach, etc. The bronchial passages and the alveolar cavities can be obstructed in certain regions, decreasing the ventilation in that portion of the lung. Tumors and malformations may be present in any portion of the air way.

It is easy to recall these facts during the administration of the anesthetic and to visualize the condition which may be present in the lungs. Some of the effects produced can be observed at the time of their occurrence if the upper air passage is obstructed. This obstruction alarms the surgeon and the anesthetist, who correct it by inserting an adequate air way and administering oxygen to the patient. The immediate oxygenation of the blood which results calms the momentary excitement, but damage may have been done to the lung, a damage that may not be noticed until hours later.

PHYSICAL PHENOMENA

In consideration of the physical phenomena which occur in obstruction, it is obvious that an obstruction of the respiratory passage, however short its duration, must be avoided.

Physically the lungs are constantly subjected to a change in pressure. Inhalation produces a negative pressure in the air passage, including the terminal portions of the alveoli. This negative pressure is resisted by the elasticity of the tissues; the inflow of blood to the capillaries; the entrance into the air passage of air, of carbon dioxide, moisture, etc., from the blood, and of a certain amount of mucus; and by the resistance of the intercostal spaces.

Bearing in mind the anatomy and physiology of the lungs, it must be admitted that an obstruction will cause serious damage to the alveolar tissue. Experiments conducted on patients under the influence of anesthesia show that the vacuum created in the air passage of the lung may reach a maximum of about 40 mm. of mercury. This vacuum is present if an inspiration is produced

when the upper air way is obstructed and the air passage is at the same time resisting the impact of the negative pressure. This vacuum reduces the effectiveness of the resisting factors—rush of blood to the capillaries, elasticity of the tissues, inflow of mucus into the air passage, etc.—and affects especially the carbon dioxide factor and the physical changes occurring in the lungs. The last may consist in edema of the alveolar walls with extravasation of blood, which may reach the alveolar cavity. The first or the carbon dioxide factor is very important because, if in a given time the carbon dioxide is drawn out of the blood in large quantities, the respirations will stop due to the lack of carbon dioxide excitation upon the respiratory centers.

TYPES OF OBSTRUCTION

Obstructions may be divided into three types: partial obstructions which prevent inhalation, partial obstructions which prevent exhalation, and total obstructions.

The writer's observations are limited to patients with whom ether has not been used, and for this reason it can be stated that all cases of bronchial pneumonia were due to some type of obstruction.

In the first type, the obstructing element acts as an exhalant valve but prevents inhalation. The result is an increase in the elimination of carbon dioxide from the blood, and this, in turn, causes a decrease in the number of respirations per minute and may even cause breathing to stop entirely. In this case the patient suffers not only from lack of oxygen, but also from lack of carbon dioxide. The lack of carbon dioxide decreases the excitability of the heart centers, resulting in a retardation of the circulation of the blood. The color of the patient varies from dark grey to pale grey. Relaxation occurs, reflexes disappear and temporary shock ensues. This condition is entirely opposite from that produced by total obstruction.

In total obstruction there is an accumulation of carbon dioxide in the air passage and the respirations are over excited. The color of the patient varies from dark greyish blue to dark blue and is typical of that seen in asphyxia. It is caused by lack of oxygen and an excess of carbon dioxide. In these cases the action of the heart is excited and the circulation of the blood is increased to its maximum, the inhibiting action of the carbon dioxide being carried first to the respiratory centers and later to the circulatory centers. This condition, even though it is more alarming than that produced by obstruction to inhalation, will cause less damage to the nerve cells and to the tissues in general than will the latter. The fact that its symptoms are alarming causes the anesthetist to act more promptly to relieve the condition than he does in cases of obstruction to inhalation.

Obstruction to exhalation is produced when air inhaled is retained partially or totally in the air passage. The patient in this case is dark blue in color, but intermingled with the blue are patches of normally colored skin, indicating the presence of completely oxygenized blood. A bluish face and a pink ear or pink portions in a bluish chest may be seen. This condition resembles the phenomenon present in the newborn when Botal's foramen persists. It is really due to a mixture of arterial and venous blood and is produced by partial oxygenation of the venous blood. If this obstruction is total, whereby the air enters the lungs but does not leave them, the pressure in the air passage becomes positive, producing distension of the alveolar wall, congestion of the pulmonary circulation, and other effects, to be noted later.

EFFECT OF OBSTRUCTIONS

All these forms of obstructions may occur in any of the bronchial ramifi-

cations. In other words, they may be anatomically localized to a small portion of the lungs and will not cause the above mentioned symptoms, but harmful results will nevertheless follow. They may produce bronchial infarcts with retention of mucus, serum, etc., which will lead to localized infection or abscess of the lung and create an ideal medium for the development of bronchial pneumonia or localized collapse of the lungs. This condition may be localized to a very small region or to the entire lobe.

The damage to the lung will be according to the type of obstruction. If the obstruction prevents inhalation, the negative pressure which results may be powerful enough to produce generalized extravasation of blood into the alveolar tissue and even into the lumen of the alveoli; this condition will produce a temporary edema of the alveolar wall (mechanical edema of the lungs) which will produce deficiency of the interchange of gases. In addition, this irritation of the alveolar wall will render it susceptible to the invasion of bacteria, followed, perhaps, by bronchial pneumonia, or the exudate may serve as an ideal culture medium for the pneumococcus, which may be present, followed by lobar pneumonia. This last condition, however, the writer has very seldom observed.

Obstruction to exhalation will cause an increase in the positive intra-alveolar pressure, reaching in some cases a maximum of 40 mm. of mercury, which may cause the rupture of a small or a large number of alveoli. The later pathological results in this type, however, are similar to those found in obstruction to inhalation.

PREVENTION

With a clear picture in our minds of the mechanism of obstructions and of the lesions produced by them in the lungs, the next step is to try to prevent their occurrence.

First of all, a complete examination of the air passage should be made before administration of the anesthetic to determine whether there is any pathology present (nasal, oral, pharyngeal, laryngeal, etc.) which may interfere with the free administration of the inhalant anesthetic. During this examination all clinical symptoms should be determined regarding the nervous excitability of the patient, which later may produce nervous spasms of the glottis, muscles of the pharynx and jaw, etc. This condition is easily corrected by administering a sedative, which can be a barbiturate, the night before the operation, or by giving morphine-atropine or morphine-hyoscine, in half doses one or two hours before the operation, followed by another dose half an hour before the operation. Any rectal anesthetic may be used for premedication, to be determined according to the patient's need. A fairly heavy premedication is sometimes objected to by the surgeon, who claims, rightly, that it depresses and retards the respiration; but an alert anesthetist will take advantage of the effect of premedication and give the patient just enough anesthetic to produce the necessary relaxation.

Many air way devices have been designed by different anesthetists. In each an attempt is made to adapt the device as nearly as possible to the anatomy of the pharynx (wire, rubber, etc. being used). Any of these pharyngeal air ways can be inserted, if necessary, but all are defective and worthless in laryngeal obstructions. In cases of the latter type, a tracheal air way like the one designed and made by Dr. Ben Morgan, of Chicago, gives excellent results. As will be noted in the picture, there are three essential portions to the device: *A*, the oral-pharyngeal portion; *B*, the esophagus-laryngeal portion, which is a ball about one and one-half inches in diameter and which has the double function of sealing the upper portion of the

larynx and occluding the paryngeal portion of the esophagus, keeping it free from material regurgitated from the stomach; and *C*, the portion which is introduced into the trachea. The *A'*-portion is designed to permit removal by suction of any mucus which may have accumulated in the air passage or of water which may be present in case of drowning. The use of suction will not interfere with the administration of anesthesia or artificial respiration. A simple pharyngeal air way will be sufficient in most cases to keep the upper air passage free from any obstruction; if necessary, the tracheal tube herein described can be introduced.

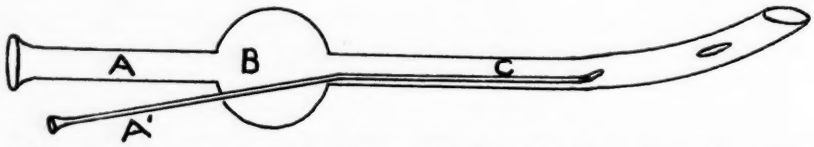


Fig. 1. Tracheal air way. *A*, oral-pharyngeal portion; *B*, esophagus-laryngeal portion, a ball about 1½ inches in diameter; *C*, portion introduced into trachea, *A'* portion for the use of suction.

The placing of any air way is a simple matter if the patient has had premedication sufficiently heavy to decrease all pharyngeal reflexes. The air way may be left in place until the patient awakes. If the premedication has been insufficient and reflexes are still present, the use of cyclopropane in adequate doses is advised; this should be given before the introduction of the tracheal tube is attempted, followed by the administration of the inhalant anesthesia.

RESULTS

For three years Dr. Morgan has used this method on my patients. During this time we have watched very closely the air way factor, and only one case of bronchial pneumonia has occurred. This was a case of streptococcic appendicitis with positive blood culture in which a secondary localization of the streptococcus was carried to the lungs by the blood. Dr. Morgan with his tremendous experience in anesthesia states that he has obtained very good results from using this air way.

SUMMARY

The anatomy of the respiratory tract is reviewed to show how obstructions occur during the administration of inhalation anesthesia. Obstruction may be partial, affecting either inhalation or exhalation, or complete. Premedication and a tracheal air way device will relieve and often prevent obstruction.

RÉSUMÉ

L'importance du conduit aérien durant l'anesthésie

L'auteur nous décrit l'anatomie des voies respiratoires afin de mieux discuter comment dans le cours de l'anesthésie les voies parfois sont obstruées. L'obstruction peut être partielle, interessant l'inhalation ou l'exhalation, ou complete. La prémedication et l'emploi d'un appareil destiné à maintenir béant le conduit trachéen soulagent et souvent préviennent l'obstruction.

ZUSAMMENFASSUNG

Die Wichtigkeit einer Luftkanüle während der Anästhesie

Die Anatomie des Respirationstrakts wird kurz wiederholt um das Vorkommen von Verschlüssen während der Inhalationsanästhesie zu erklären. Ein Verschluss kann vollständig oder teilweise sein, in welchem Falle entweder Ein-oder Ausatmung beeinträchtigt wird. Die der Operation vorhergehende Behandlung und eine Trachealkanüle

werden oft einem Verschluss vorbeugen oder ihn wenigstens erleichtern.

SUMARIO

Importancia de las vias-aereas en anestesia

Un resumen de la anatomia de las vias aereas es hecho para indicar las localizaciones de las distintas obstrucciones que pueden presentarse en la anestesia por inhalación. Las obstrucciones son divididas de acuerdo con el mecanismo en tres tipos pricipales: (1) Obstruccion á la inhalación, (2) obstrucción á la exhalación, (3) y obstrucción total. Cada una de estas puede presentarse en una forma mixta. La prevención de obstrucciones es indicada.

RIASSUNTO

Importanza di un tubo per il passaggio dell'aria durante l'anestesia

Si presenta l'anatomia dell'apparato respiratorio per dimostrare come ostruzioni possono accadere durante la somministrazione di un anestetico per inalazione. L'ostruzione puo essere parziale, impedendo o l'inalazione oppure l'esalazione, o completa. Uso di medicazione prima dell'operazione ed un tubo tracheale aiutera e spesso evitera l'ostruzione.

The American Association for the Study of Goiter will meet in annual session April 15-17 at Rochester, Minn. Papers will deal with goiter and other diseases of the thyroid gland. Dry clinics will be conducted by guests of the Association and operative clinics, by the staff of the Mayo Clinic. The Van Meter prize award of $300 and two honorable mentions will be presented to those submitting the best essays concerning original work on problems related to the thyroid gland.

The Wellcome Gold Medal and cash prize of $500 will be awarded by the Association of Military Surgeons of the United States "for researches, discoveries, inventions, designs, improvements, essays or any other acts or deeds . . . . desirable and helpful to the objects of the association, and relating to any phase of medico-military affairs and disease control associated with the army, navy, militia and public health and marine hospital service." The competition is open to members or persons eligible for membership in the Association.

TREATMENT OF THE COMPLICATIONS OF PENETRATING GUNSHOT AND STAB WOUNDS OF THE THORAX*

CARL R. STEINKE, M.D., F.A.C.S.
AKRON, OHIO

PENETRATING wounds of the thorax are due mostly to gunshot and stab injuries. In a previous article[1] 171 gunshot and stab wounds of the chest with 87 penetrating wounds were reviewed. At this time the treatment of the chest complications resulting from these penetrating wounds is to be considered.

Usually, stab wounds are less serious injuries than gunshot wounds, since their depth is limited to the length of the implement used, whereas a bullet may travel completely through the body and injure structures or organs along its course at varying distances from its point of entrance. The mortality is much higher in gunshot than in stab wounds, because not only the structures composing the thorax are apt to be more seriously damaged, but also the organs in other parts of the body frequently are injured.

In this series of 87 cases the principal cause of death was damage within the chest. Of the 7 (19 per cent) deaths occurring in the 30 penetrating stab wounds, 5 were the result of intrathoracic hemorrhage, 1 was from bronchopneumonia with empyema, and 1 from suppurative pericarditis after cardiac suture. Of the 18 (36 per cent) deaths occurring in the 50 penetrating gunshot wounds, 9 were due directly to thoracic conditions alone, and 5 to hemorrhage in the chest associated with lesions outside the thorax. One patient died of retroperitoneal hemorrhage, one of empyema and abdominal abscesses, one of empyema and chest hemorrhage, and two of bleeding from the chest and the abdomen, with the greatest amount of blood in the thorax.

COMPLICATIONS NOTED

The following chest complications were noted in this group of 87 cases:

Complications	*No. of Cases*	*Per Cent*
Hemothorax	33	39
Pneumothorax	6	7
Pneumohemothorax	10	11.5
Cardiac injury with hemopericardium	4	4.6
Mediastinal hemorrhage	2	2.3
Pyohemopneumothorax	1	1.1
Empyema	3	3.5
Infected wounds	5	5.75
Severe pleuritis	12	13.8
Pericarditis	3	3.5
Pneumonia	10	11.5
Partial collapse	10	11.5
Emphysema	21	25
Injury to large thoracic vessels	2	2.3
Diaphragm perforation	12	13.8
Fractured ribs	4	4.6

Complications reported by other authors, but not observed in this series are chylothorax, abscess of the lung, and massive gangrene of the lung.

The complications will be discussed individually.

SHOCK

Shock is present to some extent in all cases of penetrating wounds of the thorax and when not serious is treated by rest and sedation, especially the administration of morphine. The patient should be kept warm by the application of external heat. The more severe manifestations are due to hemorrhage alone, or to hemorrhage and associated complications. Proper treatment of these conditions is essential in overcoming shock.

*Read at the Fifth Assembly of the United States Chapter of the International College of Surgeons, Venice, Florida, February 13, 1940.

LACERATION OF TISSUE

Laceration of lung tissue is present in a large percentage of cases, but often such laceration is minor or unrecognized. In this series no case was operated upon primarily for laceration, so that the number is undeterminable.

Conners and Stenbuck[3], in a series of 32 cases, observed only 3 in which the lungs were lacerated, when as a rule only the chest wall was operated upon, but in another series of 32 cases, in all of which operation was performed by exteriorization of the lung, laceration was discovered in 24. By this procedure the mortality was reduced practically 50 per cent. After intensive study they conclude that operation is advisable in cases of the following: sucking wounds, wounds close to the sternal borders with likelihood of injury to the heart and the internal mammary vessels, those in which the lung presents itself in the open wound, or in which the penetration might involve the diaphragm, or with tense pneumothorax, or with marked subcutaneous emphysema.

Bohrer[4] states that both entrance and exit wounds of the lung should be found in gunshot cases, that lacerations of the lung should be smoothed by cutting away the torn portion and any larger vessels or bronchi in the lacerated part ligated. The lung wound should be sutured and exteriorized.

PNEUMONIA

There were seven cases of pneumonia with five deaths in the 50 cases of gunshot wounds. One was diagnosed as lobar and four as bronchial; in two the type was not stated. A gunshot injury to the skull was associated with one while in another fracture of the left humerus and severance of the spinal cord confirmed at laminectomy were found.

Of the 37 stab cases, there were two of lobar pneumonia, one of bronchial, and one of unstated type, with one death.

Of the six deaths, autopsy was performed in three cases and the cause of death was found to be more often the complicating condition rather than the pneumonia. Uncomplicated pneumonia, which seldom occurs in these cases, should be treated by rest and sedation. If the expectoration contains streptococci sulfanilamide should be used. When pneumococci are found, the type should be determined and the proper serum, or preferably, sulfapyridine, should be given. In most of the cases of pneumonia without other complications recovery resulted from this specified treatment.

COLLAPSE OF THE LUNG

Partial collapse of the lung in penetrating gunshot and stab wounds of the chest is not uncommon, and many patients do well with expectant treatment. If other complicating conditions are present, treatment of these associated lesions will take care of the collapse.

PLEURISY

Pleurisy is usually due to trauma of the pleura, and if no infection results, the patient will do well with general rest together with immobilization of the affected side. Either heat or cold may be applied. If infection sets in, empyema usually develops and must be treated as such.

PNEUMOTHORAX

Pneumothorax was an infrequent complication in this series, as there were only six cases. If only a small amount of air is present, no special therapy is required, but if the quantity is large, the air should be aspirated with a syringe or in the extreme cases, a pneumothorax apparatus. A large quantity of air causes compression of the opposite lung as well as the lung of the affected side, with marked embarrassment of

respiration. Cyanosis may be present. Pneumothorax is frequently associated with hemothorax.

HEMOTHORAX

Hemothorax is the most frequent complication observed, but in many instances it requires no special treatment. The compression caused by the blood in the thorax may check extensive or serious bleeding; consequently, the patient should be watched carefully, and if no serious symptoms arise, aspiration or open thoracotomy should be delayed several days. The blood usually clots slowly, if at all, in the pleural cavity, due to the smooth endothelial lining, so that aspiration may be all that is required. At times intercostal incision with removal of blood and clots is necessary.

If injury to an intercostal blood vessel, an internal mammary vessel, or any large intrathoracic vessel is suspected, immediate operation should be performed. Ligation of both ends of the bleeding vessel should result in recovery, provided the lost blood or its equivalent is replaced into the circulation and no other serious complication is present. Autotransfusion or the usual donor-recipient transfusion is of advantage, if there is much loss of blood or associated shock. The blood from the pleural cavity has been used safely for autotransfusion and also the blood which has come from the liver, spleen, stomach, kidney or a perforated blood vessel. However, if the lower small intestine or the colon is perforated, there may be danger from contamination with resultant septicemia.

There were 18 instances of hemothorax in the cases of gunshot wounds, with 9 deaths (50 per cent), and 15 in the cases of stab wounds, with 6 deaths (40 per cent), a total of 33 with a mortality of 45 per cent in the hemothorax cases. Conners and Stenbuck[3] advocate removing the blood because of the danger from pressure or infection, but the writer does not believe this is necessary. Hemorrhage may occur occasionally in the mediastinum, where the blood clots quickly, and a large vessel is usually involved. This is difficult to diagnose and is a serious condition. One patient in this series died of hemorrhage, and at autopsy 4,000 cc. of clotted blood were found in the mediastinum.

PNEUMOHEMOTHORAX

In some cases it is difficult to distinguish between hemothorax and pneumohemothorax. Without roentgenograms of the chest it is next to impossible to differentiate between them, and even then, unless the exposures are made in at least two planes, a moderate amount of air may be overlooked.

This probably accounts for the discrepancy between the 38 per cent of cases of hemopneumothorax in Boland's[2] series and the 11.5 per cent in this series, since the addition of his hemothorax to his hemopneumothorax cases gives 63 per cent, whereas the writer's combined cases total 50 per cent.

The treatment of pneumohemothorax is similar to that of hemothorax unless there is a considerable amount of air present with marked dyspnea or cyanosis from compression of the opposite lung, when open operation with lung suture or packing with exteriorization and ligation of the bleeding vessels is indicated.

Nine of the 10 patients had gunshot wounds, two (22 per cent) of whom died, one having perforation of the liver, esophagus and diaphragm with hemoperitoneum, and the other having perforation of the stomach and diaphragm with two and one-half liters of blood in the left side of the chest. Both patients had undergone laparotomy.

EMPYEMA

Empyema occurred in six cases (6.9 per cent) with three deaths, one being a case of pyohemothorax. One patient had

a rib resection but died on the twenty-fourth day; autopsy revealed abscesses of the spleen and the subhepatic area as well as the empyema. Autopsy on the second patient showed bronchopneumonia on the opposite side. The third was shot six times through the right chest; autopsy revealed bronchopneumonia on the same side of the empyema, and a dilated stomach. The best treatment is rib resection and open drainage.

Elkin[5] states, "Infection of the pleura and thoracic viscera rarely follows penetrating wounds." He reports 553 cases with empyema in eight (1.4 per cent) of these; all were treated by rib resection and open drainage, with one death.

HEMOPERICARDIUM

Hemopericardium following cardiac injury was noted in four cases with four deaths. The one patient with a gunshot wound underwent operation, the heart and pericardium being sutured. The diaphragm had been perforated and the gastric contents were found in the pleural cavity. The patient died on the operating table from cessation of cardiac action without a laparotomy being performed.

In another case the heart was sutured and the pericardium drained with rubber tissue, the patient surviving 15 days. Autopsy revealed suppurative pericarditis as the cause of death. The other two had left hemothorax with the hemopericardium, one living only a few hours.

Despite the high mortality, these patients should be operated upon when possible.

DIAPHRAGMATIC PERFORATION

Diaphragmatic perforation was found in 10 gunshot cases with seven deaths, and in two stab wound cases with one death. In six cases the diaphragm was sutured, with four deaths, all due to thoracic hemorrhage. Usually perforation of the diaphragm is not serious in itself and does not require immediate suture. The mortality of 66 per cent (8 cases) was due to hemorrhage in six instances, empyema in one, and to death on the operating table while the heart was being sutured in the eighth.

MISCELLANEOUS INJURIES

The abdominal aorta was perforated, resulting in death from hemorrhage, in one case. Two patients died of hemorrhage from large vessels in the thorax.

Usually only one rib is fractured, and this in itself is not a serious condition. When possible, some method of limiting the motion of the side involved is all that is necessary. There were four cases in the series in which a fractured rib was found.

Infected wounds require nothing more than free drainage.

EMPHYSEMA

Emphysema was noted in 10 of the stab cases and in 11 of the gunshot cases (24 per cent of the 87 cases), and none was so extensive as to require special treatment. One patient died in four days of pneumonia, and two of hemorrhage during the first day, but none died primarily from the emphysema. In no instance was there sucking of the wound.

SUMMARY AND CONCLUSIONS

The conclusions drawn from the study of this series of cases and from a review of the literature on the subject are as follows:

1. The patient should be examined carefully immediately upon admission to the hospital; morphine should then be given.

2. Patients with signs of marked hemorrhage or with heart tamponage should be taken directly to surgery for immediate operation. The blood should be saved when possible and given as an autotransfusion.

3. Other patients should be put to bed and watched closely, after preliminary roentgenograms have been taken in two planes. Films should be taken with a portable apparatus one to four hours later, depending upon the progress of symptoms.

4. Patients should be typed for transfusion as soon after admission as possible.

5. Perforation of the diaphragm requires no immediate attention unless it is sutured while operating for another condition.

6. Heart injuries are very serious, and repair should be attempted, particularly when tamponage is present.

7. Empyema is a rare complication. When present it is best treated by open drainage.

8. Laceration of lung tissue is best treated by suture or packing, together with exteriorization.

9. Pneumothorax should be undisturbed unless marked, and then air removal or open operation is indicated.

10. Hemothorax and pneumohemothorax should be treated expectantly unless excessive intrathoracic pressure is present or marked hemorrhage is noted, when operation should be undertaken.

11. Hemorrhage was the cause of death in the largest number of cases.

12. There were 25 deaths in this series.

BIBLIOGRAPHY

1. Steinke, C. R.: Penetrating Gunshot and Stab Wounds of the Thorax; Report of 87 Cases, J. Thoracic Surg. 8: 658, 1938-1939.

2. Boland, F. K.: Chest Wounds in Military and Civil Practice, Mil. Surgeon, 81: 175, 1937.

3. Conners, J. F., and Stenbuck, J. B.: Penetrating Stab Wounds and Bullet Wounds of the Chest; Study of 68 Cases Operated Upon Between June 1, 1931, and April 30, 1932, With Description of New Operative Procedure of Extrapleurization and Exteriorization of Pulmonary Laceration, Ann. Surg. 97: 528, 1933.

4. Bohrer, J. V.: Thoracic Injuries, New York State J. Med. 35: 749, 1935.

5. Elkin, D. C.: Wounds of the Thoracic Viscera, I.A.M.A., 107: 181, 1936.

DISCUSSION

DR. J. C. DAVIS (Quincy, Fla.): The question of donors in rural districts and small hospitals is at times difficult. Ingenuity and adaptability of the most versatile surgeon are often taxed to the limit. Many of these patients have a great deal of native resistance and tenacity. To control hemorrhage, the most appropriate approach for upper thoracic injuries is through the periosteal bed of the fourth rib after the rib has been resected, and of the seventh for injuries of the lower thoracic region; from either of these openings as many ribs as necessary may be excised anteriorly or posteriorly to give good visualization and a wound through which to work. After ligation of these vessels, singly or *en masse*, with mattress sutures and removal of the devitalized lung areas, the chest is tightly closed and pneumothorax instituted, as advocated by Dr. Steinke. When the hemothorax is caused by midlung or peripheral bleeding, it is controlled by early (within two, three or four days) aspiration and pneumothorax. Cases are on record in which a high temperature dropped after a great deal of blood was removed, no evidence of infection being present. Where pneumothorax is used the manometer should be the guide. If it is not available, air equal in amount to 300 or 400 cc. more than the amount of fluid removed is used. Some advocate 200 to 300 cc.; one may judge it with the stethoscope and by physical signs; collapse of the lung is noted by an absence of variation. By the early removal of blood and the replacement of the blood with air one is often able to control hemorrhage, arrest secondary and prevent subsequent hemorrhage and infection and shorten the patient's stay in the hospital and his disability. Air compression will not control hemorrhage from the internal large vessels, nor will it control hemorrhage from the intercostals and the internal mammary vessels; these should be doubly ligated.

RÉSUMÉ

Traitement des complications des plaies pénétrantes du thorax soit par armes à feu, soit par armes blanches

L'auteur étudie les complications thoraciques de 87 cas de plaies pénétrantes du thorax. Les perforations du diaphragme ne demandent aucune attention immédiate à moins qu'on ne les suture au cours d'autres interventions. En cas d'hémorrhagie grave, on opérera immédiatement. Les blessures du coeur sont sérieuses; on essayera de suturer la plaie. L'empyème sera drainé. Les lacérations du poumon seront suturées ou tamponnés. L'hémothorax, le pneumothorax, le pneumo-hemothorax seront traitées conservativement excepté dans les cas très graves. Dans cette serie, il y eut vingt-cinq décès.

ZUSAMMENFASSUNG

Behandlung der Komplicationen von penetrierenden Schuss-und Stichwunden des Brustkorbs

Die Behandlung von Brustkorbkomplicationen, die in 87 Fällen von Brustwunden auftraten, ist dargestellt. Perforation des Zwerchfelles benötigt keine unmittelbare Behandlung ausser eventuell einer Naht während einer Operation für andere Verletzungen. Wenn eine ausgesprochene Blutung vorhanden ist sollte sofort operiert werden. Herzverletzungen sind sehr gefährlich und operative Behandlung sollte versucht werden, speziell wenn eine Herztamponade im Entstehen begriffen ist. Empyem, das eine seltene Komplication darstellt sollte mit offener Drainage behandelt werden. Zerrissenes Lungengewebe sollte mit Naht oder Tamponade behandelt werden. Pneumothorax, Hämothorax und Pneumohämothorax sollten allein gelassen werden ausser wenn sie sehr ausgesprochen sind. 25 von diesen Fällen starben.

SUMARIO

Tratamiento de Complicaciones de Heridas de Puntura y Armas de Fuego de el Torax

El tratamiento de las complicaciones pulmonares ocuridas en 87 casos de herida penetrante del pecho es considerado. Perforación de el diafrágma no requiere atención inmediata al menos que éste se suture cuando operando por otra lesión. Si marcada hemorragía esta presente, debe de operarse inmediatamente. Lesiones del corazón son muy serias; reparación debe de atentarse, particularmente cuando halla taponaje. Empiema, una complicación rara, es mejor tratado con un drenage abierto. Tejido pulmonar lacerado debe ser tratado por sutura y taponamiento. Pneumotorax, hemotorax y pneumohemotorax deben de ser dejado quieto si es posible. En ésta serie hubieron 25 muertes.

RIASSUNTO

Terapia delle complicazioni delle ferite penetranti d'arma da fuoco e d'arma da taglio nel torace

Si considera la terapia delle complicazioni del torace su 87 casi di ferite penetranti del torace. La perforazione del diaframma non richiede attenzione immediata, ammenochè sia suturata mentre si opera per un'altra condizione. Se vi è una forte emorragia, bisogna operare immediatamente. Le lesioni del cuore sono molto gravi; si dovrebbero riparare, specie se vi è tamponage. L'empiema, una complicazione rara, è meglio curata con il drenaggio aperto. Il tessuto polmonare lacerato deve essere suturato oppure zaffato. Il pneumotorace, l'emotorace ed il pneumoemotorace non devono essere disturbati, ammenochè siano molto marcati. In questa serie vi sono stati 25 morti.

FELLOWSHIP DUES, AS WELL AS DUES FOR MEMBERSHIP AND ASSOCIATE MEMBERSHIP, ARE PAYABLE NOW AND SHOULD BE SENT TO DR. BENJAMIN I. GOLDEN, DAVIS MEMORIAL HOSPITAL, ELKINS, W. VA.

LATE MANIFESTATIONS OF SYPHILIS AND GONORRHEA OFTEN MISTAKEN FOR PROSTATIC HYPERTROPHY

A. L. WOLBARST, M.D.
NEW YORK

THE urinary disturbances which occur in chronic gonorrhea and in late syphilis are often unrecognized as such and may be mistaken for the obstructive symptoms of prostatic hypertrophy. As these end-results usually occur in late middle life — the so-called "prostatic age" — there is likely to be some confusion in establishing a clean-cut diagnosis of the true etiology. It is therefore probable that many men of advanced years have been subjected to prostatectomy, with its inevitable mortality risks, whereas a more thorough study would have revealed the correct diagnosis and contraindicated the surgical attack on the prostate.

MEDIAN BAR OBSTRUCTION

It is essential to remember that even though there may be a narrowing of the vesical neck, with all its concomitant urinary symptoms, the condition is not necessarily due to prostatic hypertrophy. The prostate may not be grossly enlarged to an appreciable degree, yet there may be a contracture of the vesical neck or a middle bar, which presents all the symptomatic phenomena of adenomatous prostatic obstruction. In many of these cases, the obstruction is purely inflammatory or congestive and not adenomatous; usually it is a chronic manifestation or end-result of a systemic focal infection. These vesical obstructions or bars may be gonorrheal or nongonorrheal in origin; the latter type may have their origin in an infectious focus in the teeth or tonsils or in long-continued sexual practices, such as "withdrawal," which produce the same congestive results. In most instances, however, the bar represents a sclerotic process deriving from a chronic prostato-vesiculitis of gonorrheal origin. Treatment directed to the removal of the infection usually results in the elimination of the obstructing bar and the disappearance of the offending symptoms. It is evident, therefore, that when such an inflammatory bar causes urinary obstruction and retention of urine, prostatectomy is not indicated, even though the prostatic lobes may be found through the cystoscope to be enlarged.

It is always a delicate point in diagnosis to determine whether an obstruction of the normal urinary flow is the result of a congestive bar or a true adenomatous hypertrophy. In great measure, one can be guided by the fact that the hypertrophic obstruction does not respond to measures which may be successfully employed in the congestive type. Before the introduction of intra-urethral resection, when prostatectomy was the only successful method of removing the obstruction, this diagnostic differentiation was exceedingly important; today, however, with superior methods of diagnosis and greater perfection of technic, resection is frequently resorted to, irrespective of the essential character of the obstruction. Some urologists, however, still believe that the obstructing tissue can be removed equally well and without any risk whatever by appropriate treatment directed to the original focal cause.

Certain fundamental facts must be recognized in order to avoid serious error. Mere enlargement of the prostate,

when examined per rectum, bears little or no relevance to prostatic obstruction. A small projection of the prostate into the urethra at the vesical neck may and often does produce complete retention of urine, whereas a postgonorrheal congested prostate bulging into the rectum may have no obstructive effect whatever on the urinary flow. Too often, indeed, does the inexperienced young surgeon assume that the urinary symptoms produced by a congested prostate are due to hypertrophy, because of the bulging mass felt in the rectum. Obviously, a certain degree of the general enlargement of the congested prostate and vesicles necessarily will point in the direction of the urethra and thereby produce the obstructing median bar. By the same token, however, with the decrease in size of the rectal bulge following treatment, a corresponding decrease in size of the median bar will occur simultaneously and the urinary symptoms will be relieved. While this may appear elementary to the experienced surgeon, it is often overlooked.

STRICTURE FROM GONOCOCCAL INFECTION

In addition to the median bar obstruction, we have the less common urinary disturbances produced by a tight stricture of the urethra following gonococcal infection. The problem of a correct diagnosis is much more difficult than that of the congested bar, though the symptoms are practically alike. When it occurs in the "prostatic age," one is inclined to assume that we are dealing with an adenomatous hypertrophy of the prostate. It will be found, however, on further investigation, that certain principles which obtain with true hypertrophy no longer hold true. For instance, in hypertrophic obstruction a catheter of large caliber can be introduced into the urethra and bladder with far greater ease than can one of small caliber. It is a cardinal rule in urologic practice to use the largest catheter possible, not the smallest, in order to avoid unnecessary trauma. In stricture, on the other hand, the large catheter is obstructed and in extreme cases, nothing but a filiform bougie can be made to enter the bladder. Following the passage of the filiform bougie, introduction of a cystoscope is impossible without previous gradual dilatation of the stricture. This confirms the strong suspicion of stricture rather than hypertrophy as the basic cause of the urinary obstruction. Gradual dilatation, with or without perineal section, removes the obstruction and with it, the urinary disturbances.

Finally, we must consider the so-called "neurotic" postgonorrheal urinary symptoms. These may be mentioned briefly as increased urinary frequency, especially during the day, stammering and difficulty in starting the stream and marked phosphaturia. The increased frequency may be associated with polyuria, which may be more or less constant. In extreme cases the urine may be voided several times in an hour, but characteristically only during waking hours. There is no call to void at night.

The urine may be phosphatic, but hyperacidity is very common and productive of considerable local distress owing to the associated presence of an irritable vesical neck. The latter is usually due to a chronic verumontanitis of gonococcal origin. This form of polyuria responds quickly to alkalization of the urine, when it is acid, with or without the application of local medication to the congested posterior urethra. In these cases, as in cases of median bar obstruction, the urinary antiseptics are generally quite useless with the exception of pyridium, which seems to have a remarkably sedative and analgesic effect on the irritated vesical neck and the associated urethrocystitis.

CORD BLADDER OF NEUROSYPHILIS

Taking up the late syphilitic phenomena, we have to consider mainly the cord bladder associated with neurosyphilis. One of the difficulties encountered is the fact that the symptoms are not sharply defined in the early stages. There may be a little dribbling after urination or slowness in starting the stream. This is followed by involuntary micturition during sleep, which may be the first symptom to arouse the patient's suspicion that something is wrong. A spinal fluid examination and an investigation of the neurologic factors, especially the reflexes, may be so convincing of the presence of spinal cord disease that radical operative measures will not be considered. In doubtful cases, however, cystoscopy is very useful, but it should not be resorted to as a routine measure except when necessary to make the diagnosis. In spinal cord bladder the vesical trabeculations and the substantial amount of residual urine fully corroborate the serologic and neurologic findings and make the diagnosis beyond question.

It need not be emphasized that true prostatic hypertrophy may coexist with a tabetic bladder; the urologist is then faced with a real problem. Removal of the prostate or intraurethral resection may remove the physical obstruction but it will not materially diminish the problem of bladder distension and its overflow. The bladder still remains atonic and incapable of emptying itself; but removal of the obstruction creates a wider and more accessible bladder neck which might ameliorate the local difficulties somewhat. Systematic catheterization of the tabetic bladder is not good practice because of the infection which inevitably follows; but when infection already has occurred, it is advantageous to have a wider vesical neck rather than a contracted one.

The tabetic bladder may have a very large capacity — 600 to 1,000 c.c. — without causing the discomfort that a much smaller amount would induce in a nontabetic bladder. In the later stages, after infection has been established, the bladder may contract considerably, producing marked inflammatory evidences on the vesical mucosa.

RENAL SYPHILIS

While renal syphilis undoubtedly occurs, direct evidence, that is, the finding of the Treponema, is extremely rare. There is reason to believe, however, that many cases of chronic nephritis have a syphilitic background. The same may be said of cases of chronic cystitis of obscure origin. Atypical ulcerations and gummata have been observed which responded kindly to antiluetic treatment, the diagnosis thus being established.

NECESSITY OF HISTORY AND CLINICAL EVIDENCE

An error that is often made in urologic practice is the acceptance of the cystoscopic picture as final, without due regard to the clinical evidence and the history. Cystoscopy always should be accompanied by complete serologic and clinical examinations. If this is done, it will be found that what at first may have appeared to be prostatic hypertrophy actually proved to be a neurogenic bladder or a median bar congestion of gonorrheal origin. It is extremely rare that the diagnosis of true hypertrophy is not correctly made; a more frequent error occurs in cases of pseudohypertrophy with urinary symptoms which simulate those of true hypertrophy.

REPORT OF CASES

A few cases are herewith reported in which urinary symptoms were considered by competent surgeons sufficiently diagnostic of prostatic hypertrophy to justify recommendation of operation. In most instances of this kind, the diagnosis was made on cystoscopic evidence

of prostatic enlargement. These cases are typical of a great many found in our personal records and are presented in order to illustrate the point that we should not depend on the cystoscope alone for our diagnosis. In some of the cases, the trouble was caused by incipient spinal cord disease; in others, by a chronic congestive prostato-vesiculitis; in a few, by a tight stricture of the urethra; in a large number, by marked pathology in and around the verumontanum and vesical neck; in still others, by a hypersensitive vesical neck irritated by a hyperacid urine; and in one case, by a pin-point meatus. The fact that relief followed measures other than the proposed prostatectomy and that this relief has persisted with occasional minor remissions for periods varying from 10 to 25 years, is sufficient evidence that hypertrophy was not the predominant cause of the urinary dysfunction.

CASE 1. P. G., a writer, aged 60, was first seen in February, 1927. His complaint was increased frequency of micturition and perineal pain; he voided every three hours, diurnal and nocturnal, for a period of seven or eight months; he had had gonorrhea 40 years previously. Prostatectomy had been advised.

On examination, the prostate was found large and hard; the right seminal vesicle was palpable and sensitive to touch; the voided urine was clear, but the expressed prostato-vesicular secretion contained much pus. The urethral length was normal; residual urine, 40 cc. The diagnosis was chronic prostato-vesiculitis, probably of gonorrheal origin.

Combined vasotomy and vasectomy was advised and performed. The result has been satisfactory. When last seen, February, 1938 (11 years later), he reported that he was feeling well, with no urinary symptoms.

CASE 2. G. M., a merchant, aged 35, the father of two children, consulted me in June, 1909. For several months he had noticed occasional pain in the urethra, increased nocturnal frequency, straining at urination and a flow of urine on sexual orgasm. Previous history of syphilis or penile lesion was denied. He admitted a gonococcal infection eight years previously from which he had fully recovered. Prostatectomy had been advised.

The residual urine was 540 cc., and was markedly purulent; no stricture was present; the prostate was large and congested; the knee jerk was absent; pupils were unequally dilated; the Romberg sign was negative; the Wassermann reaction was 4 plus. A diagnosis of incipient tabes and chronic prostatitis was made.

Under appropriate treatment the urine became clear, the residuum disappeared and his symptoms improved perceptibly. He was under antiluetic treatment during the next 29 years, with frequent intervals of no treatment, and attended to his business successfully. Death occurred in June, 1938, at 64, the cause being coronary thrombosis.

CASE 3. L. M., a merchant, aged 58, was first seen in June, 1917. His complaint was difficulty in starting the stream and greatly increased frequency, 10 to 15 times by day and 4 to 6 times at night; symptoms had been present 4 or 5 years and were becoming progressively worse. He left the city and was not seen again until September, 1928, 11 years later (age 69); symptoms were practically the same. A few months previously cystoscopy had been performed in a western city and prostatectomy advised.

Examination revealed a fairly large prostate, soft and boggy in places; the left seminal vesicle was definitely palpable and tender to the touch; gentle prostatic expression brought forth a purulent secretion at the meatus. The five glass test (Wolbarst) showed that the pus in the urine originated in the vesicles. Residual urine (three tests) varied from 20 to 40 cc.; the urethral length was normal. A diagnosis of chronic prostato-vesiculitis was made.

Combined vasotomy and vasectomy was performed in October, 1928. The patient was last observed in November, 1937; he was then 78 years of age. He felt well, the urine was clear, he had no nocturnia and the residuum was 30 cc. He reported occasional attacks of vesical irritation which responded quickly to pyridium medication.

CASE 4. E. P., insurance broker, aged 49, married 12 years, the father of five healthy children, was in perfect health up to a year previously when he noticed a weakening of the stream, increased frequency and delay in starting the stream. Tentative diagnosis of prostatic hypertrophy, made by his physician, was corroborated by a urologist who performed a cystoscopy and found large prostatic lobes and bladder trabeculations. Prostatectomy was advised.

Examination in January, 1914, revealed clear urine, residuum of less than 30 cc., urethral length normal and the prostate somewhat enlarged. The Wassermann reaction (2 tests)

showed 4 plus. The knee-jerk was absent, pupils were unequally dilated, and a slight Romberg sign was present. A history of a penile lesion 20 years previously was elicited. A diagnosis of incipient tabes was made.

He took antiluetic treatment for several years and evidently made a complete recovery. He was active in his business until his death of pneumonia in December, 1938, aged 74.

CONCLUSION

These cases serve to illustrate the main thesis of this paper, namely, that symptoms similar to those produced by hypertrophy of the prostate may be the result of spinal cord disease or chronic gonorrheal prostato-vesiculitis and that before prostatectomy or intraurethral resection is advised, these end-results of syphilis and gonorrhea must be eliminated through painstaking study and examination. The number of patients that will recover without operation and remain well for many years fully justifies the meticulous attention to diagnostic details which this particular study entails.

RÉSUMÉ

Manifestations tardives de la syphilis et de la gonorrhée prises pour une hypertrophie de la prostate

Des symptômes semblables à ceux produit par l'hypertrophie de la prostate peuvent résulter de mâladies de la corde épinière ou d'une prostato-vésiculite gonorrhéique chronique. Avant de recommander une prostatectomie ou une résection intra-uréthrale, il faut éliminer l'existence de séquelles de la syphilis et de la gonorrhée. Le nombre de malades qui se rétablissent sans opération et vivent en bonne santé pendant des années justifie l'étude approfondie exigée par ce désideratum.

ZUSAMMENFASSUNG

Spästadien von Syphylis und Gonorrhoe, die oft fälschlicher Weise für eine Prostatahyperthrophie angesehen werden

Symptome, die denjenigen die von Prostatahypertrophie hervorgerufen werden sehr ähnlich sind, können durch Erkrankungen des Rückenmarks, oder durch chronische Gonorrhoe der Prostata verursacht werden. Daher müssen diese Spätstadien von Syphylis und Gonorrhoe durch exaktes Studium und Untersuchung ausgeschaltet werden, bevor eine Prostatektomie oder introuretrale Resektion vorgeschlagen werden. Die Zahl der Patienten, die ohne Operation wieder hergestellt werden und sich für viele Jahre wohlbefinden geben diesem sorgfältigen und notwendigen Studium seine volle Berechtigung.

SUMARIO

Manifestaciones tardias de sifilis y gonorrea á menudo equivocadas por prostatitis hipertróficas

Síntomas similares á esos producidos por hipertrófia de la próstata puede ser el resultado de enfermeeades de la médula espinal ó próstato-vesiculitis gonorreica crónica. Antes que la prostatectomía ó resección intrauretral es aconsejada, estos resultados finales de gonorrea ó sífilis deben de ser eliminados á traves de estudios y exámenes cuidadosos. El número de enfermos que se curan sin la operación y permanecen sanos por muchos años justifican el estudio cuidadoso que esto requiere.

RIASSUNTO

Tardi manifestazioni di sifilide e di gonorrea spesso malcomprese per ipertrofia prostatica

I sintomi simili a quelli prodotti da ipertrofia della prostata possono essere causa di grave malattia della spina dorsale o gonorrea cronica vescica-prostata. Prima di consigliare chirurgia prostata o risezione intrauretra si devono eliminare i risultati consequenti di sifilide e di gonorrea per mezzo di studio

e di esame accurati. Il numero dei pazienti che ricupereranno senza operazione e staranno bene per molti anni guistifica lo studio diligente che vi si richiede.

WOUND DISRUPTION AND POSTOPERATIVE HERNIA

JOHN A. GREEN, M.D., F.A.C.S., F. I.C.S.
ROCKFORD, ILLINOIS

A POSTOPERATIVE wound may disrupt completely or partially. When the separation of the various tissues is incomplete, the stage is set for a subsequent postoperative hernia.

Wound disruption, either complete or partial, generally occurs from the fourth to the tenth day following operation. Postoperative hernia, resulting from incomplete wound separation, may become apparent a short time following operation, or months or even years later. Nevertheless, when the hernia does manifest itself, one can be assured that the origin of the condition dates back to time of the patient's early convalescence.

Few patients with postoperative hernia realize that during this period they avoided a wound disruption. Therefore, it is necessary to consider wound disruption and postoperative hernia together, since they are the result of the same causative factors and differ only in degree.

INCIDENCE

The incidence of wound disruption and postoperative hernia is similar. The Mayo Clinic reported in 1919 an occurrence of postoperative hernia of 2.5 per cent in 28,270 abdominal operations. Wound disruption takes place in 1.5 to 3 per cent of incisional wounds[1,2,3] of the abdomen.

Branch,[4] reporting 3,142 cases of hernia operated upon at the Peter Bent Brigham Hospital, found 9.5 per cent to be of the incisional type. Sloan[5] quotes Mason as reporting a percentage of 10.8 in 5,502 hernias operated upon at the Mayo Clinic as being postoperative in origin.

Wound disruption is a formidable condition. The mortality is estimated at 15 to 50 per cent.[6,7,8] Repair of many large postoperative hernias is attended with great risk due to postoperative complications.

Singleton[9] is of the opinion that the condition is preventable, but Baldwin[2] states it will continue to occur until all the causative factors can be accurately measured.

ETIOLOGY

There are several causative theories. The Freeman theory states that due to inadequate closure of the peritoneum the omentum, acting as a wedge, forces its way through the peritoneum. The omentum finally becomes strangulated and

then acts as an expanding wedge. Rupture results from sudden strain.

Weber's theory states that the condition is probably the result of an increase in the acidity of the tissues caused by some form of systemic intoxication.

The toxic theory, which is similar, states that healing is retarded or absent due to some toxemia, with resulting acidosis. As a result, catgut absorption takes place at a much earlier date. The true mechanism of the condition in all instances still remains unknown. This is evident from the different opinions expressed by various writers. Maes[10] feels that the cause is not any single factor but a number of different ones. Mason[11] states the problem is one of proper wound healing.

FACTORS INFLUENCING WOUND HEALING

There are several factors, both local and general, that must be considered in wound healing.

1. *Local Factors*:

A. CONDITION OF THE WOUND. Due to various contaminating factors, no postoperative abdominal wound is germ free when closed. Harrison[6] states that all incised abdominal wounds cultured, before closure, will show infective organisms. This is because complete sterilization of the operative zone is impossible.

Under normal conditions, due to the small number of organisms present, tissue resistance will prevent an increase in this infectious process and primary healing will take place. Bacteria cannot increase in normal healthy granulation tissue to the extent of producing infection. Clean wounds, therefore, should never be drained, since such drainage will often result in a marked infection.

Under normal conditions, wound healing will take place in a definite way. According to Maes,[10] there first occurs the formation of fibrin which glues the wound edges together. This is followed by a proliferation of vascular buds and young fibroblasts. After 48 hours the fibroblasts become prominent and soon form adult fibrous or scar tissue. Howe and Harvey[12] state that the tensile strength of a healing wound depends upon the growth and maturation of these fibroblasts. The maximum strength of this healing process is normally reached by the twelfth to the fourteenth postoperative day. One-third of this strength is obtained by the sixth and healing is two-thirds complete by the eighth day.

Any local or systemic condition that interferes with this process of fibroplasia or prevents proper wound edge coaptation will cause delayed or imperfect healing. This will predispose to later trouble. Any tissue, whether it is bone or soft tissue, will heal in a direct ratio to its blood and nerve supply, other conditions being equal. Interference with the nerve and blood supply by undue trauma or by long periods of stretching abdominal tissues with self-retaining retractors, resulting in accumulations of blood and serum, all tend to interfere with proper wound healing.

B. TYPE OF INCISION. The method of abdominal approach still continues to be a debatable question. Dickson states that in longitudinal incisions there is a constant tug of war going on between the two groups of oblique muscles. This will put tension on the suture line and produce an ischemia of the wound edges with necrosis. Wounds that are completely relaxed and have a good blood supply will heal, regardless of the type of suture used.

Sloan[5] feels that the longitudinal type of incision is responsible for wound disruption and postoperative hernia. He recommends the Phannenstiel and McBurney types of incision for lower abdominal approach and claims that no wound disruptions follow this method. There is no question but that transverse

incisions close more easily and that tissue approximation is completed under less tension because of the absence of the lateral pull of the posterior sheath of the rectus muscle and of the skin. Unfortunately, while transverse incisions may be more anatomically correct and easier to close, they do not give as good exposure, which is so necessary for good surgery. Extension of the operative wound is more difficult with transverse incisions and the time required to enter the abdomen is longer. The majority of surgeons still favor the longitudinal type of incision with the exception of the McBurney type for simple appendectomy.

The fibers of the posterior sheath of the rectus muscle run transversely and are without question one of the most important structures to be considered in wound closure. In longitudinal wounds the posterior sheath often splits when closure is attempted due to the lateral muscle pull. This can usually be prevented with a mattress type of suture.

McNealy and Lichtenstein[14] aptly compare the transversalis fascia and the peritoneum as the inner tube of the abdomen and the oblique muscles and external fascia as the casing. They stress the careful approximation of these tissues if good repair is to be expected. Sloan,[5] however, states that tissue repair cannot be expected if tissues are destroyed and replaced immediately with some mechanical substitute.

The probability is that the type of incision is not a great factor in wound healing provided careful closure of the different tissue layers is made.

The location of the incision is also probably of no great import. Some writers[15,16] report a higher incidence of wound difficulties in upper abdominal incisions, while others[17,18] feel that disruption and hernia are more likely to follow lower abdominal wounds. Unless wounds are drained, the incidence will probably be similar.

Meleney[8] states that 15 per cent of all incised abdominal wounds become infected. Such wounds will, of course, be more likely to cause subsequent trouble.

C. Suture Material and Method of Suturing. Any condition or material that causes an increase in wound exudation will delay healing by retarding fibroplasia. Catgut will do this and may therefore increase the possibility of wound infection in a field that is not absolutely sterile. This is especially true of the larger sizes of catgut. Realizing this possibility and the fact that a suture need be no stronger than the tissue it approximates, one should use the smaller sizes of catgut.

McLeney[19] states that 0 chromic catgut has a greater tensile strength than the tissues in which it is used. Larger sizes are therefore not necessary or desirable. The advantage of catgut, according to Kootz,[20] is that it is an absorbable material. In the presence of infection it does not act as a permanent foreign body with the danger of sinus production. The disadvantage of catgut is that one can never know how rapidly it will be absorbed.

Silk is a nonabsorable suture. It will remain in the tissues indefinitely and causes practically no tissue reaction. However, in the presence of infection, it acts as a foreign body. When silk is used, a special technic is necessary for satisfactory results. Some writers condemn the use of silk and catgut together. Others do not hesitate to use both in the same operative field. When silk is used, the smaller sizes are desirable. Interrupted sutures should be used instead of a continuous suture. When silk is sterilized, it should be boiled and boiled but once. Boiling it in a light mineral oil will apparently increase its tensile strength. It should never be used in infected wounds.

Kangaroo tendon sutures have the same faults as catgut. They are much stronger than necessary for the tissues

they approximate. Due to their size they cause increased exudation and irritation in the tissues, and because they act as a foreign body, fibroplasia will be delayed. For these reasons they are not desirable.

There is a difference of opinion as to whether a wound should be closed with continuous or interrupted sutures; whether catgut or silk or a combination of both is better; and whether the wound should be closed by the terrace method or with through and through nonabsorbable sutures. Kennedy[1] advocates through and through sutures in wound closure, care being taken that the different tissue layers are properly approximated. He never uses buried sutures except silk, and then only in incisional ventral and umbilical hernias in which wide separation of the tissues is present, and in the obese. He states that neither he nor his predecessor, Dr. Price, has ever had a wound disruption following this method.

In all the operations which I have performed for disrupted wound, the incision has been closed with through and through sutures of heavy silk, and good union has been secured in each case. One cannot but wonder if primary healing would not have occurred had the wound originally been so treated.

Thorek,[21] on the other hand, reports a series of 15,000 cases in which closure was by the terrace method with silkworm gut or wire retention sutures; no eviscerations and no serious difficulties resulted. Some writers do not favor tension sutures at all on the grounds that they predispose to wound infection.

Great amounts of catgut used in closing wounds tend to strangulate tissues and cause tissue necrosis, with subsequent edema, exudation and hemorrhage. It therefore predisposes to infection. Extravasated blood acts as a foreign body and makes an excellent culture medium for the organisms present. These conditions can be prevented by maintaining complete hemostasis; taking care not to include too much tissue in ligatures and sutures; and using the minimal amount of catgut.

The electrocoagulating knife leaves more necrotic and devitalized tissue than is present after a clean incision. Ellis[22] feels that two distinct types of tissue effect can be produced by electrosurgical machines, depending upon the quantities of the current employed. Undue massive coagulation of tissues with charring and subsequent sloughing prevents proper wound healing and predisposes to secondary hemorrhage.

Both Woolsey[23] and Ellis[22] feel that devitalized tissue acts as a nidus for infection and that a wound can never heal until all such dead tissue is removed or extruded.

According to Schuerch,[24] daily irradiations after the method of Coutard can be used preoperatively without materially injuring tissue, but delayed healing and subsequent infection will follow electrocoagulation due to the presence of necrotic tissue. It is estimated that only 60 per cent of electrosurgical wounds heal by primary union.

D. Infected and Drained Wounds. The greater number of wound disruptions and postoperative hernia occur in infected and in drained wounds.[19] The old rule, "When in doubt, drain," was changed several years ago to "Do not drain if there is a doubt." With a better understanding of the probable futility of abdominal drainage, fewer drains, in the future, will be used. When drainage must be used, drains down to, but not through, the peritoneum will probably be more effective and should lessen the incidence of wound disruption and future hernia. When intraabdominal drainage is necessary, a stab wound type, if possible, is more desirable.[19,25] One is often surprised in this type of case to see how much more rap-

idly the incisional wound will heal as compared with the stab wound. The incisional wound, in these cases, will often heal as normally as any uncomplicated wound. When drains are placed through the incisional wound, care must be used not to strangulate tissues by too tight suturing around the drain and to reinforce the suture line at these places. According to Glassner,[13] the associated infection that occurs, subsequent to drainage, causes an early absorption of catgut and is also responsible for the early slipping of knots. This is concurred in by Harnagel,[25] who deplores the use of unnecessary drainage and also comments on the difference in the rapidity of healing in undrained and drained cases.

Hartzel[15] is of the opinion that drainage through an operative wound favors disruption or subsequent hernia by not allowing proper tissue approximation. He quotes Bryce, McFetridge and Jenkins as being of the same opinion.

Excessive wound tension is unquestionably a factor in proper wound closure. Glassner[13] states that all other factors are secondary. When postoperative abdominal tension becomes sufficient, the fibers of the posterior sheath of the rectus muscle are the first to break. This is followed by a separation of the peritoneal edges and normal healing is prevented. Baldwin[2] recommends closing the peritoneum and posterior sheath of the rectus muscle with mattress sutures in order to give these tissues better support.

Sloan[5] feels the length of the incision increases the risk of inefficient closure in direct ratio to its length. Other writers state that this makes no particular difference.

2. *General Conditions*:

Wound disruptions may occur at any age from early infancy to old age, but they are more likely to develop in the age extremes. Recently I have had this experience in a six-weeks old emaciated baby suffering from pyloric stenosis. Secondary closure with through-and-through silk sutures was followed by good union.

Some writers[16,1,13] maintain that the condition occurs most often in the age that carcinoma exists, namely, the third to the fifth decades. It must be remembered that more surgery is done during this period than at other periods. However, wounds do heal more slowly in the presence of systemic disease (carcinoma, anemia and cachexia, jaundice and diabetes) and in cases of marked dehydration and general debility.

Deficiency in vitamin C, hypoproteinemia or an allergic condition may be a contributing factor to delayed or imperfect healing. Hartzel and Winfield[15] quote Wolbach and Howes as being of the opinion that many patients, due to vitamin C deficiency, lack the ability to produce and maintain the intracellular substance necessary to produce healing. This tendency is noticed in the early spring and fall, when vitamin C is supposed to be at its lowest ebb. The condition seems to be more frequent in Northern than in Southern races. Animal experiments show that animals fed on a high protein diet have more rapid and complete wound healing than those subjected to low protein intake.

Postoperative coughing, vomiting, abnormal straining and distention, especially the latter, may all be causative factors. This is especially true in debilitated patients and in the obese. Since the Wagensteen tube has been used for bowel decompression, cases of abnormal postoperative distention have become a much less serious complication.

Fine and Hermanson[26] have recently reported the relief of abdominal distension with pure oxygen inhalations, which they state will eliminate the main factors of distension, namely, hydrogen and nitrogen. This method may prove help-

ful in patients not suffering from interference with the return blood supply.

Kosdoea[27] states the thyroid gland plays an important part in wound healing and Eitel and Biecher[28] have found that the thyrotropic hormone of the anterior pituitary to be of value.

TREATMENT

After the wound has disrupted, certain definite procedures are necessary. Depending upon the patient's general condition, the wound should be resutured or treated by tamponade and strapping.

If it is to be sutured, the abdomen should be prepared by scrubbing with green soap and water. Irritating antiseptics of all kinds should be avoided. A protruding omentum, if strangulated, should be removed. If it is not strangulated, it can be gently washed with salt solution and replaced. Any protruding intestine should be treated the same way. Due to edema in the wound edges and the difficulty of recognizing accurately the different wound layers, it would seem that a through-and-through type of suture closure is better. Heavy silk, silkworm gut or wire may be used. Silk is less likely to cut through tissues than are the other materials. It is the opinion of some that closure by the terrace method should be again attempted. Strange as it may seem, hernia following wound disruption is relatively rare, regardless of the method of closure.

In some instances the patient's general condition does not warrant any surgical procedure. These patients and those with grossly infected wounds should be treated by the tamponade method. The technic is simple. It consists merely of cleansing and packing the wound with gauze and strapping together the wound edges with adhesive plaster. McCauliff[29] advises this type of procedure in all disrupted wounds.

When postoperative hernia begins, it is often a typical protrusion of the intra-abdominal contents through the inner layers of the abdominal wall. Later, as it becomes larger, it assumes the characteristic features of the well developed hernia. The neck of the hernial sac is relatively small. The incidence of obstruction depends upon the size of the neck of the sac. Postoperative hernia differs somewhat from other types of hernia in that no true sac is present. In this type the whole region of the scar spreads and the peritoneum is often closely adherent to the skin, with no intervening tissues.

The technical difficulties in the repair of these conditions become greater as the hernia increases in size. Repair of very large hernia is sometimes impossible. With a small hernia, exposure is usually easy, the sac is often removable and some form of fascial imbrication is possible. Interrupted sutures are especially desirable in these cases.

Rothschild[30] has suggested an ingenious type of closure for large hernia in which the peritoneal cavity is not opened. No attempt need be made, therefore, to free adhesions. Such an operation causes less shock and lessens the risk of peritonitis and postoperative ileus, which are common complications in this type of surgery. In this operation it is necessary partially to denude the rectus muscle. Sufficient time has not elapsed to determine whether or not healing will be impaired by such a procedure.

Kootz,[31] reviewing Gallie and Le Mesurier's work, advises autogenous grafts of fascia lata or preserved animal fascia. He recommends the basket weave type of closure for all areas that cannot be approximated. When this method of closure is used, the approximation of the grafts must be sufficiently close to prevent the occurrence of hernia between the graft strips. Preserved fascia, while not as ideal as the autogenous graft, is much superior to both heavy catgut and kangaroo tendon. The fascia grafts will eventually become incorporated into the tissues. Catgut and kan-

garoo tendon will remain as foreign bodies until they are absorbed.

Schlesinger[32] advises against opening the abdomen or attempting to remove large hernial sacs. Such a sac, he states, is a good pad to be used in the reconstruction of the abdominal wall. The type of operation he recommends is very similar to that suggested by Rothschild except for a special technic used in approximation of the fascia and muscle. In the repair of these wounds interrupted and mattress types of sutures are desirable, regardless of what kind of suture material is used.

General or spinal anesthesia are preferable because local anesthesia can only add extra insult to tissues that are largely severely taxed.

SUMMARY AND CONCLUSIONS

1. Postoperative separation of abdominal incised wounds, whether complete or incomplete, is an accident attended by serious possibilities.

2. Wound disruption and postoperative hernia result from no one, but from several different causes, both local and general.

3. The location and type of wound and the type of suture material used are factors of secondary importance.

4. A knowledge of normal wound healing and of the factors that delay such healing is imperative.

5. Infected wounds and drained wounds should receive special attention.

6. It is to be hoped that with a better understanding of these conditions, wound disruption and postoperative hernia will become less frequent and will eventually be eliminated.

REFERENCES

1. Kennedy, J. W.: Tragedies of the Abdominal Incision, Am. J. Surg. 25: 512 (Sept.) 1934.

2. Baldwin, J. F.: Disruption of Abdominal Wounds, Ibid. 7 (July) 1934.

3. Colp, R.: Disruption of Abdominal Wounds, Ann. Surg. 99: 14 (Jan.) 1934.

4. Branch, C. D.: Incisional Hernia: Analysis of Three Hundred Cases, New England J. Med. 211: 949 (Nov.) 1934.

5. Sloan, H. P.: Physiologic Abdominal Incisions, Am. J. Surg. 45: 515 (Sept.) 1939.

6. Harrison, P. W.: Postoperative Infections, Ann. Surg. 104: 316 (Aug.) 1936.

7. Glen, F., and Moore, S. W.: The Disruption of Abdominal Wounds, Surg., Gynec. & Obst. 65: 16 (July) 1937.

8. Meleney, F. S., and Howes, E. L.: The Disruption of Abdominal Wounds with the Protrusion of Viscera, Ann. Surg. 29: 5 (Jan.) 1934.

9. Singleton, J.: Disruption of Wounds and Postoperative Hernia, Surg., Gynec. & Obst. 68: 1103 (June) 1939.

10. Maes, W.: The Influence of Control of Hemorrhage and Protection of Granulations in Wound Healing, abstr. in Surg., Gynec. & Obst. 69: 114 (Aug.) 1939.

11. Mason, M. L.: Wound Healing, Ibid. 60: 303 (Oct.) 1939.

12. Howes, E. L. and Harvey, S. C.: Studies in Wound Healing, Ann. Surg. 102: 941 (Nov.) 1935.

13. Glassner, S. T.: Evisceration and Avulsion of Abdominal Wounds, Am. J. Surg. 32: 63 (Apr.) 1936.

14. McNealy, R. W., and Lichtenstein, M. E.: Postoperative Hernia, Ibid. 18: 90 (Oct.) 1932.

15. Hartzel, J. B., and Winfield, J. M.: Disruption of Abdominal Wounds, Surg., Gynec. & Obst. 68: 585 (June) 1939.

16. Grace, R. V.: Disruption of Abdominal Wounds, Ann. Surg. 99: 28 (Jan.) 1934.

17. Albin, G.: Early Postoperative Eventrations, Ginek Polska 11: 563, 1932.

18. King, E. S. J.: Incisional Hernia, Brit. J. Surg. 23: 35-44 (July) 1935.

19. McLeney, F. L.: The Disruption of Abdominal Wounds with the Protrusion of Viscera, Ann. Surg. 99: 5 (Jan.) 1934.

20. Kootz, A. R.: Suture Material for Hernia Repair with Special Reference to Preserved Fascia Strips, South. M. J. 25: 372 (Apr.) 1932.

21. Thorek, Max: Postoperative Rupture of Abdominal Wounds and Eventration, in Thorek, Max: Modern Surgical Technic, Philadelphia, J. B. Lippincott Co., Vol. 3, chap. 32, page 1263.

22. Ellis, J. D.: Electrosurgical Incisions, Arch. Surg. 26: 981.

23. Woolsey, J. H.: Physiology in Surgery, California & West. Med. 30: 388 (June) 1929.

24. Schuerch, O.: Operating and Healing of Wounds in Regions Treated with Roentgen Rays According to Coutard, Schweiz. med. Wchnschr. 63: 935 (Sept.) 1933.

25. Harnagel, E. J.: Abdominal Drainage: Its Uses and Abuse, J. Iowa M. Soc. 26: 299 (June) 1936.

26. Fine, J. B., and Hermanson, L.: The Treatment of Gaseous Distention of the Intestines by the Inhalation of 95 per cent Oxygen, Ann. Surg. 103: 375 (Mar.) 1936.

27. Kosdoea, A. S.: Influence of the Thyroid Gland on the Healing of Wounds, Archiv. f. klin. Chir. 179: 551-560 (June) 1934.

28. Eitel, H., and Riecher, O. E.: Thyroid Gland and Healing of Wounds, Brun's Beitr. z. klin. Chir. 164: 69-78 (July) 1936.

29. McCauliff, G. J.: Rupture of Wounds Following Abdominal Operations, J. Iowa M. Soc. 23: 347 (July) 1933.

30. Rothschild, Norman: Repair of a Large Incisional Hernia by Flaps of the Anterior Sheath of the Rectus, Ann. Surg. 99: 220 (Jan.) 1934.

31. Kootz, A. R.: Preserved Fascia in Hernia Repair with Special Reference to Large Postoperative Hernias, Arch. Surg. 26: 500 (Mar.) 1933.

32. Schlesinger, A.: Operations for Large Hernias of Abdominal Cases, Zentralbl. f. Chir. 59: 1151 (Sept.) 1932.

Additional bibliography will be published in the reprints.

RÉSUMÉ

La rupture des plaies et des hernies post-opératoires

Les complications sont dues à différentes causes, locales et générales. Le siège et la nature de la plaie et la nature du materiel de suture sont des facteurs d'importance secondaire. Il importe de bien comprendre les facteurs de cicatrisation normale et d'éloigner tout ce qui peut retarder l'union des plaies. Les plaies infectées et les plaies nécessitant le drainage recevront des soins minutieux. Les plaies seront resuturées ou tamponnées et les marges rapprochées par des bandes d'emplâtre adhésif selon l'état général du malade.

ZUSAMMENFASSUNG

Aufbrechen der Wunden und postoperative Brüche

Aufbrechen der Wunden und postoperative Hernien werden nicht durch eine einzige Ursache, sondern durch mehrere, verschiedene Gründe, die sowohl örtlicher, wie auch allgemeiner Natur sein können, hervorgerufen. Die Art und Lage der Wunde und die Art der verwendeten Not materials sind von sekundärer Bedeutung. Die Kentniss der normalen Wundheilung und der sie verzögernden Faktoren ist äusserst wichtig, Infizierte und drainierte Wunden müssen besonders beobachtet werden. Die Wunde muss wieder genäht oder mit Packung und mit Heftpflasterverband behandelt werden, je nach der allgemeinen Verfassung des Patienten.

SUMARIO

Rotura de heridas y hernias posoperativas

Roturas de heridas y hernias posoperativas tienen muchas causas diferentes, ambas local y general. La localización y tipo de la herida y la clase de sutura usada son factores de segunda importancia. Un conocimiento de la cicatrización normal de heridas y de los factores que retardan dicha cicatrización es imperativo. Heridas infectadas y con drenage deben de recibir atención especial. La herida debe de ser resuturada ó tratada por taponamiento y aproximacion con esparadrapo, dependiendo en la condición general del enfermo.

RIASSUNTO

Ferita Fratturante ed Ernia Postoperative

Ferita fratturante ed ernia postoperative risultano da non una, ma da parecchie cause diverse, ambedue locali e generali. La posizione ed il tipo di materiale di sutura usati sono fattori d'importanza secondaria. Una conoscenza di guarire una ferita normale e dei fattori che ritardano tale guarigione è imperativa. Le ferite infettate e prosciugate dovrebberro ricevere attenzione speciale. La ferita si dovrebbe risuturare o curare da tappi di cotone o d'altri tamponie e di taffettà, dipendente dalla condizione generale del paziente.

ADDRESS OF PRESIDENT FREDERICK M. DOUGLASS AT CONVOCATION OF FIFTH ANNUAL ASSEMBLY, U. S. CHAPTER, INTERNATIONAL COLLEGE OF SURGEONS

THERE is a debt that all of us have incurred to possess the title and the honored estate of the doctor of medicine.

It is the debt we owe to the men who touched our common clay and shaped it to the point of view that fits the man of medicine to labor at the very threshold of God.

They taught our eyes to see.

They taught our ears to hear.

They taught our brains to sift and weigh the evidence of eye and ear and to seek out hidden meanings beyond the frontiers of established knowledge.

They taught our hands to do the reasoned bidding of our brains, and last of all—and best of all—they taught our hearts compassion and forbearance.

Our debt is to these men but it cannot tbe paid as other debts are paid. We must pay it as they in their turn paid their debt to the men who did for them what they did so well for us. We must teach new eyes to see, new ears to hear, new brains to think incisively, new hands to serve, new hearts to be steadfast and true to the ancient trusts that have made the physician the first friend of man.

Gentlemen, medicine in our day walks upon the heights. We have made mighty conquests and our forces are arrayed for greater conquests still.

The least of us possesses knowledge and skills that would have been denounced as witchcraft a hundred years ago.

We have filled whole libraries with the store of our vast new knowledge. We have set up marvelously detailed systems for the swift exchange of information, and there is no field of medical or surgical endeavor that lacks today for a special organization to serve its special needs. Never before has medicine had such wonderful machinery for doing its work in the world.

And yet—

Yet, after all, it is only machinery, and we must not let ourselves fall into the trap of over-reliance upon system and organization, however persuasive and fool proof they may seem to be. There is too much at stake—not only the profession of medicine as we know it, but the fate of all those who look to medicine and surgery for deliverance from needless suffering and needless death.

Machinery is not enough.

It can thrust facts before our eyes, but it cannot make us see truth.

It can fill our ears with case histories and conclusions, but it cannot teach us to listen for and hear the faint whisper of individual departures from a hypothetical standard.

Machinery can fill our brains with information, but it cannot create wisdom, and there is no machine that can deliver a lecture on ethics so telling as the frown or smile of a living man whose blameless life has given blood and substance to the code of Hippocrates.

No—all these things are the province of the teacher, not of machinery; and when I say "teacher" I mean—

I mean YOU, my colleagues, ALL OF YOU.

I never knew a doctor of medicine so poor in spirit and accomplishment that he did not have *something* to add to the treasury of medicine or something to say for the guidance of others walking the long hard way that every doctor must follow.

I never knew a doctor so rich in wisdom, skill, experience, and ethical excellence that he could not learn new lessons by making common cause with lesser men.

There is no monopoly of ability and skill.

The best of us can learn from the least of us, and what we learn by putting our heads together and taking common counsel; what we learn by looking at our own failures in the light of another's success; what we learn in the electric atmosphere of the open forum—all that is the learning which brings the valleys of medicine closer to the soaring peaks of medicine and will level them for the greater good of mankind.

Gentlemen, it is not for legislators and mobs to say what the future of medicine shall be.

We are the masters of our own destiny, and

the future is secure so long as our own living flesh links with the hands of those who have gone and those who are to come.

Let us go forth from this meeting resolved to teach and be taught.

We who are the seniors—let us seek out the young man and set his feet more firmly on the upward path.

You who are young—put forth your hand for the guidance that is your birthright.

Thus—and only thus—shall our ancient debt be paid.

Thus—and only thus—shall we ever know *that progress* which Victor Hugo so truly calls "the onward stride of God."

THE VENICE ASSEMBLY

(Impressions: from the Notebook of the Editor)

CHURCH bells and the sea! A new Venice come to the judgment of men whose *pied-à-terre* is the surgical amphitheatre . . .

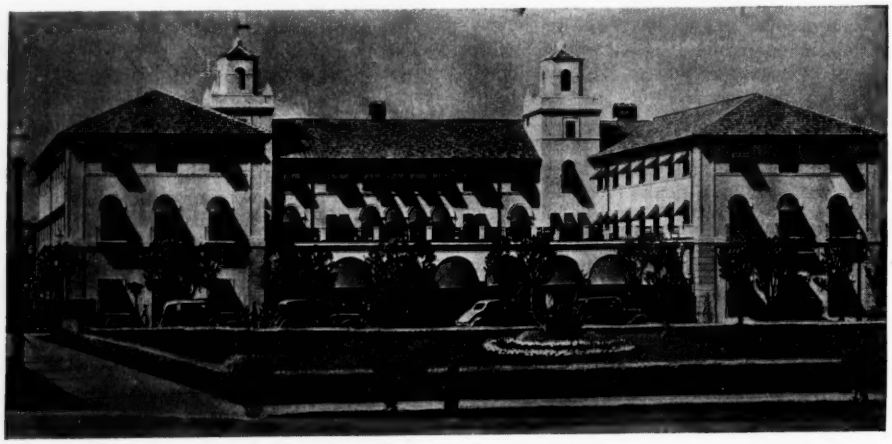
This quiet Sunday morning in a little Florida town, the pause between hours, days, weeks of work and a few breaths of communion with fellow surgeons in a conference strategic for the war we wage against disease, deformity and

"Plenty of fresh air!"

We got it.

The Albee airport and a professional air meet.

Daredeviltry *in* the ether, not *with* it, as we surgeons sometimes see! Art Davis in a plane. . . . A rube in the tall town cranes not so breathlessly. . . . How does a bomb drop? We were shown! How much of a gymnast can a man be



death. . . . Men of many climes and varied specialties, finding a common soul in the labors of mercy and humanitarianism. . . . The *leit-motif* . . . *L'esprit de corps.* . . . Three men on whose broad shoulders rested the principal burdens of the mechanics of the Assembly—Fred Albee, Fred Douglass and Charley Arnold.

—o—

Sun and the salt sea breeze! A town figuratively as clean as an operating amphitheatre.

Breakfast—coffee, hot and rich and clear as amber, fruit and cream, and the famous citrus juices and fruits of this golden land bravely set forth in the face of a record "freeze" to chill the courage of half a continent. No work today. . . . Play today? . . . Citrus and circuses, eh? What have the mentors of the Assembly prescribed?

with his plane? How much a part of him is this wonderful mechanism of silk and aluminum, steel and equilibrium? . . . That's the secret, yes—*equilibrium*—Europe has lost it—EQUILIBRIUM—the *sine qua non* of the surgeon's skill—the mirror of the eternal balance—that elusive endowment that makes it possible for men and their scalpels to enter the sacred provinces of God and Nature . . . *equilibrium*—once lost, disaster follows, to mind, to body, to brain, to soul, to men, to undertakings, to nations. . . . The sunny south a bit out of balance herself—chill frost—great thoughts, perhaps, but not great enough to forefend the aftermath of gazing too highly upward —extra systoles and cervical myalgias.

—o—

Blessedness of hot water . . . clean linen. After all, there are anodynes of semi-preciousness—and resort countries abound in the good masseuse,

though sore beset by the rampant osteopath, plague upon the trickstering charlatans, the worse-than "flies-in-the-ointment". . . . Food again . . . we will be Strasbourg geese before this ends . . . small talk . . . chit-chat . . . the pause before the storm . . . tomorrow we stuff our brains with scientific pabulum our brothers share with us . . . tonight it is our stomachs we glut.

—o—

Conversational heights of far less altitude than the aviating excursions of the afternoon . . . regret sincere at increasing messages of comrades-in-arms-and-in-scalpels chafing at what Old Man Winter is doing to their long anticipated vacations and congress of minds. . . . "Snowbound," "Car can't get through drifts," "Hope to get there before all the shouting is over". . . . Those of us already arrived shamefaced in our joy of beating the "other fellow". . . . After the food, the oratory. . . . Congratulatory telegrams from Nissen, Mandl, Manzanilla, Nájera and others.

—o—

Now to the Medical Center Lounge . . . The keys of the city awaiting, and the Mayor . . . Blalock his name . . . appreciative and charming his simplicity, his approach and his nature—an American competent he. . . . Then, shades of "Down Upon the Swanee Ribber" . . . spirituals, of course—those black boys and in the rhythms of the oppressed, ever, ever reaching outward and upward after God—the Infinite—the Unknown Beyond!

More material nourishment. The human touch —charming Mrs. Fred Albee, leading a corps of dulcet Drusillas, the other and the better halves of medicine—the doctor's wives, God bless them, unsung heroines, basic stones upon which rest many a surgeon's success (or failure), the very *roots* of his professional achievement in their provision for his human needs. . . .

—o—

Sleep—sweet sleep—no emergencies—no criticisms—no reproaches—no schemers—no vigils—no hopes—no fears—just *sleep*. . . .

Morning again! Monday morning! Wake up and live, wake up and give! . . . What have *you* learned, doctor, that your fellow Aesculapian may not know? What do you hope *he* has tucked away in his portfolio, to share today with *you?*

Theses et theses! profound, disturbing, numerous, inspiring, radical, but *none despairing!* The everlasting optimism of the sons and daughters of Hippocrates! Matchless as the serenity and persistency of the solar system. Even malignancies cannot annihilate our hopes and dreams. . . . Fred Douglass at the gavel. . . . What a whack he gives it! . . . Careful, doctor, careful! What do you think you are hitting? Is that an expression of your feelings towards the rich and idle and selfish, vain, barren and neurotic woman who is ever the bane, and sometimes the benefactress (in her last will and testament, perhaps) of the overworked physician and surgeon? *Or is that the way you feel about the interfering hand of bureaucracy in the practice of medicine and surgery?*

—o—

All hands to the round table! King Arthur's knights were never like these. . . . In shining armour they rode forth to a *Field-of-the-Cloth-of-Gold!* . . . Our forays lead us in sometimes shabby raiment in battered jallopies to the hovels of the poor, the distant cabins of the mountain sides, as well as into the scented silken boudoirs of the Croesus-like rich. . . .

The King Arthur of the morning, Dr. Charles H. Arnold . . . high light of these meetings focused on guild activities (*this has become a lusty child*) . . . place for medical cinematography—Van Ingen Brown's and Chevalier Jackson's presentations to the fore.

And so—the days—and so the nights. . . .

The "fish fry." Stars in a blue sky shining as only on the Gulf of Mexico and over the Venice Beach the stars can shine. What crisp and crackling, sweet Piscatoralia!!

But down to facts more flatly.

This cancer business! What inspiration in the illustrated address given by Dr. Temple Fay, "Refrigeration in the Human Being and Its Effect on Undifferentiated Cells, Particularly Related to Cancer."

And also, papers, addresses and pronouncements of Dr. William Lower on "Ureteral Transplantation"; Dr. Warren Davis on "Preferred Methods in Cleft-Lip and Cleft-Palate Repair"; again discussions on Guild activities by Drs. G. C. Irvin and T. L. Harris, of West Virginia; William Neal and E. J. McCormick, of Ohio; William Jepson, of Iowa; G. S. Foster, of New Hampshire; Vincent Lapenta, of Indiana, and many others. . . . Dr. Bradley Patton's "Microcinematographic and Electrocardiographic Studies of the First Heart Beats and the Beginning of the Circulation in Living Embryos" . . . impressive contribution, setting us to wondering whence the beginning and impetus of these phenomena, how to reconcile implications of these weighty manifestations with such abstract theories "as spontaneous generation". . . . Mendel, Spinoza, Haeckel, Darwin, Spencer, Virchow . . . . men and their platitudes and the Infinite and Its Being. . . . *Where is the answer?*

—o—

Released from restrictions of daily duties, doctors stand at ease . . . . small boys on a picnic . . . . all have brought their hobbies like pets to a county fair. . . . Here the three Ganns—father, wife and son—demonstrating a new respirator

the son has invented. . . . Dr. Goldsmith has found a new way of reducing the temperature of water to below freezing. . . . A new sponge demonstrated by Oscar Nugent. . . . Chevalier Jackson and Brooke Bland of Philadelphia in a lengthy Socratic dialogue in an angle of the patio. . . .

Before Steinke of Ohio, Jepson of Sioux City, DeMuth of Vancouver and Bill Carson of Milwaukee, McCormick of Ohio mounted on a rostrum, holding them spellbound. . . . President-elect Desiderio Román, smiling broadly and loitering at the Bell and Howell booth with much to say to Moses Behrend. . . . Everybody happy, everybody interested, everybody *friendly*. . . . A bit beyond, Earl Craig of Philadelphia, Tom Harris, Golden, Cannaday, terribly interested in each other's opinions.

—o—

SNAKES!

What a symposium that was on snake venom!

Came recess. Texas "Jim" Mitchell took out one of the giant rattlers. Old Croatalans is a foul, scaly, rattling length at his ever indecent best.

By the back of the neck those expert fingers of Texas Jim's grasped the rattler.

Out flashed the fangs! Deftly beneath the venom-dispensing dentury went the little white glass beaker. Drip! Drip! Venom plus venom. The snake wriggled. A visiting surgeon, as clean in a white linen suit and the aura of his sacred profession of healing as the snake was dirty in his writhing length and his lethal faculties, took a firm hold on the long, strong buttony tail of Eve's tempter's scion.

Quicker than a flash under visible hyperperistalsis the rattler ejected a stream of ochre yellow all over the white linen suit, in a great gush from his caudal extremity.

With equal promptitude the surgeon dropped the south end of the snake.

"Good Heavens! Look at this!" he cried.

Said Texas Jim, "Doctor, you would do worse if you were in that poor snake's fix." And he pointed to the reptile in all solemnity.

—o—

The last day of the Congress, Wednesday.

Every man hated to go . . . so much more we had to tell, to learn . . . and *we liked each other*. The weather was most polite. As a background to our grief, at evening the skies wept. It rained, and rained. The temperature dropped. The tempo of the sessions was pepped up to raise it! From the rostrum we heard, among others, Dr. P. Brooke Bland, and Dr. Desiderio Román, of Philadelphia; Dr. Clarke Brooks, of Detroit; Dr. André Crotti, of Columbus and Dr. E. J. McCormick, of Toledo.

—o—

At night the convocation.

Those admitted into the College from the United States Chapter and from foreign chapters were received into our midst. On the scrolls of the organization their names were inscribed. "Marshall" Golden of West Virginia led the Procession of the Convocation, with its inexpressible appeal.

And it was Golden who presented the United States Chapter with a magnificent mace, as rich in its beauty of design and workmanship as in its inherent and significant symbolism.

—o—

Afterwards the assembly about a great, roaring, flaming driftwood fire, holding in its heart the age old sign of material comfort to mankind. *If only I had had my camera with me!*

For silhouetted against that red and orange background were three real men of the day, three persons who have labored so hard in the pursuit of surgical ideals that the impress of their efforts has been perhaps the mightiest factor in the remarkable progress of the International College of Surgeons—Crotti, Albee and Arnold! I stood there, held by my own emotions, when I felt a hand on my elbow. I turned to see a vaguely familiar figure of a man with a diploma under his arm. As my senses focused on his face, recognition dawned. I knew him now—Sether, Rush, 1904. We grasped hands firmly.

"The years have been kind to you, Max," he said with great generosity.

Through my mind ran the remembrance of his own handsome countenance nearly forty years ago, free from the furrows of time and service and self sacrifice.

"You, too, my friend," I answered. "You, too, the fates have treated with consideration."

—o—

There were, of course, the inevitable post-mortems, now that the convention was closed *officially*. There was packing to be done. Last minute social amenities to be achieved. The customary rush to make the train, that is as much the part of a journey as the actual conquest of distance. And homeward bound, the savour of it all to be rehashed and digested.

Lucky for me, I am fond of hash—or ragout or goulash, whatever you wish to call it. At any rate, it is an international dish—like a good surgeon.

ADMITTED TO FELLOWSHIP — UNITED STATES CHAPTER

Dr. Ivan Allfred, Great Falls, Mont.
Dr. Leonard Averett, Philadelphia.
Dr. Horace Mitchell Baker, Lumberton, N. C.
Dr. Hamilton Isham Barnard, Denver.
Dr. Edgar Vernon Benbow, Winston Salem, N. C.
Dr. Flint Bondurant, Cairo, Ill.
Dr. Jesse Wilbert Bowers, Fort Wayne, Ind.
Dr. George Van Ingen Brown, Milwaukee.
Dr. Robert Critten Davis, Great Falls, Mont.
Dr. Frederick G. Dyas, Chicago.
Dr. Thomas Lawrence Doyle, Philadelphia.
Dr. Harry Harding Everett, Lincoln, Neb.
Dr. Haynes Jordan Freeland, Denver.
Dr. Paul Gallagher, El Paso, Texas.
Dr. John Howard Garberson, Miles City, Mont.
Dr. Alfred Myron Glickman, Springfield, Mass.
Dr. Edward Lee Harvey, Denver.
Dr. James Rudolph Jaeger, Denver.
Dr. Francis Edward Keenan, Great Falls, Mont.
Dr. William Henry Lawrence, Summit, N. J.
Dr. Joseph Sebastian Lundhomm, Rockford, Ill.
Dr. James Charles MacGregor, Great Falls, Mont.
Dr. Edward Roderick Benedict McGee, Berlin, N. H.
Dr. Felix Perryman Miller, El Paso, Texas.
Dr. Gerald Edwin Pauley, Long Island, N. Y.
Dr. Rudolph Walter Roethke, Milwaukee.
Dr. C. G. Salisbury, Ganado, Ariz.
Dr. Alvin Fernando Sether, Eugene, Ore.
Dr. Guy Arthur Sloan, Bloomington, Ill.
Dr. Lemuel David Smith, Milwaukee.
Dr. Karl Frederick Schlaepfer, Milwaukee.
Dr. Charles Bernard Voigt, Mattoon, Ill.
Dr. John R. Vasko, Great Falls, Mont.

ADMITTED TO MEMBERSHIP — UNITED STATES CHAPTER

Dr. Harold Augustus Benson, Poughkeepsie, N. Y.
Dr. Richard Joseph Boyce, Poughkeepsie, N. Y.
Dr. Henry Augustus Buchtel, Denver.
Dr. Myron Lester Curtner, Vincennes, Ind.
Dr. John Dawson Hayward, St. Louis, Mo.
Dr. Joseph Hersh, Pittsburgh.
Dr. H. Quillian Jones, Fort Myers, Fla.
Dr. Harry Allison Keener, San Diego, Calif.
Dr. John Daniel Lamon, Jr., Albuquerque, N. M.
Dr. Charles Luke Leonard, Rockford, Ill.
Dr. Lawrence Matthew Marley, Chicago.
Dr. Kenneth Charles Sawyer, Denver.
Dr. Ralph Leonard Towne, Kalispell, Mont.
Dr. John E. Wyttenbach, Indianapolis.
Dr. Paul Conley Furgason, Indianapolis.

ADMITTED TO ASSOCIATE MEMBERSHIP—UNITED STATES CHAPTER

Dr. Robert Hannon Fitzgerald, Leadville, Colo.
Dr. Robert Lucian Hamilton, Marysville, Calif.
Dr. Bernard Anthony Karwiski, Toledo.
Dr. William Winslow Biedemann, Toledo.

ADVANCEMENTS—UNITED STATES CHAPTER

Dr. Edward A. Lebold, Salem, Ore., Associate to Member.
Dr. Andre Blythe Carney, Tulsa, Okla., Member to Fellow.

ADMITTED TO FELLOWSHIP—INTERNATIONAL COLLEGE

Dr. Otto DeMuth, Vancouver, British Columbia, Canada.
Dr. Enrique Gonzales Pastor, Concepcion, Chile.
Dr. Alejandro Cerisola, Mexico City, Mexico.
Dr. Antonio Cornillon, Mexico City, Mexico.
Dr. Manuel F. Madrazo, Mexico City, Mexico.
Dr. Esteban Paulín, Queretaro City, Mexico.
Dr. Rafael Macías Peña, Aguascalientes City, Mexico.
Dr. Aquilino Villaneuva, Mexico City, Mexico.

HISTORY OF THE COLLEGE AND GUILD FUNCTIONS

RADIO ADDRESS BY
CHARLES ARNOLD, M.D., F.I.C.S.
LINCOLN, NEBRASKA

LADIES and gentlemen of the radio audience, and fellow members:

In Switzerland, the oldest Republic in the world, on the shores of Lake Geneva, in the historic Peace City of Geneva, the INTERNATIONAL COLLEGE OF SURGEONS was founded in 1935.

The original body was a group of Regents, selected from the leaders in the surgical profession, from every country of the civilized world. It was the aim of the Founders to require these Regents, not only to assist in the governing of the INTERNATIONAL COLLEGE OF SURGEONS' Body, but to see to it that national chapters were formed in their respective countries and districts.

Because of the generally upset conditions in the world, brought about by the ravages of war, it has been impossible to carry out to the fullest extent this original conception of the Founders.

We are pleased to state, however, that in a number of countries of the world, among which are Mexico and the United States, outstanding chapters have been organized, and are functioning according to the purpose laid down in the original Constitution.

In December 1936, there was a meeting of sixty-three Regents from the United States at the Academy of Medicine Building, in New York City, who launched the United States Chapter.

These Regents elected officers, and appointed Committees, and charged them with the drafting of a Constitution and By-Laws to govern this group in the United States. The duties with which they were charged have been carried out, and the Chapter was properly incorporated.

The first Scientific Meeting of the United States Chapter of the INTERNATIONAL COLLEGE OF SURGEONS was held at the Waldorf-Astoria Hotel in New York City in June 1937.

At this meeting, authorities in their respective specialties presented papers of intense interest and the discussions following were indicative of the appreciation of those in attendance.

In February of the following year, under the able chairmanship of Dr. Julien O. Pate, of Tampa, Florida, an outstanding Scientific Assembly was held which will long be remembered.

In October 1938, under the direction of the Philadelphia Committee, the THIRD ASSEMBLY of the College was held in that city. Besides the excellent scientific papers a number of fine clinics were held at leading Philadelphia hospitals.

At the Philadelphia meeting members and delegates present ratified by unanimous vote the proposed changes in the International Constitution.

These changes definitely eliminated any objectionable features which may have been present in the original draft, and placed the organization in a position where no one could doubt its ideals and purposes, and the unselfish desire of its leaders to assist in raising the standards of surgery.

In May 1939, the FOURTH ASSEMBLY of the United States Chapter was held in New York City in conjunction with the first Scientific Assembly of the International Body. At this meeting, there were representatives from 25 foreign countries, and an outstanding scientific program was presented by these visiting surgeons, together with clinics at the leading New York hospitals.

At this meeting, headed by Ambassador Nájera and Dr. Manzanilla, the newly formed Mexican Chapter, composed of outstanding members of the Mexican Surgical Society, were admitted to the central organization.

We are gathered this week in Venice, Florida, at the Florida Medical Center, with Dr. Fred H. Albee and Dr. Julien C. Pate as hosts, to participate in the FIFTH ASSEMBLY of the United States Chapter.

Our program is graced by outstanding men from every part of the United States, together with representatives from Canada, Mexico, and Cuba. The registration at this Assembly far exceeds that of any of the preceding meetings.

The formation of Postgraduate Study Guilds was early recognized as one of the essential departments of this institution.

The Founders of the INTERNATIONAL COLLEGE OF SURGEONS realized, as we all do, that there are many adequate surgical societies which have for their aim, as we do, the advancement of the art and science of surgery. One of the principal aims of the Founders is to perpetuate and afford the opportunity to gain the necessary knowledge to better serve humanity. In fact, since its inception the Founders aimed that this should be made the primary and principal function of the College.

In order to do this successfully, it was unanimously decided that Postgraduate Study Guilds should be instituted in every State in the Union, and in subdivisions of countries where national chapters were formed. These Postgraduate Study Guilds were legally authorized on July 18, 1937 and were made a part of the International policy at the Philadelphia International Executive Assembly in 1938.

By direction of the President of the United

States Chapter, the Regents in their respective states were charged with the duty of assembling and electing from their midst a President, Secretary, and Treasurer, and such other Officers as they might require to function according to the By-Laws of the Parent Body.

After this organization meeting, they were further charged by the President to hold at an early date surgical clinical meetings, at which gatherings, members residing in respective localities to the members assembled were to present clinical cases and perform operations.

Those presenting cases would be required to read the record of each patient, showing that a careful history had been taken, and that logical reasoning was employed to arrive at a correct diagnosis. The operating technic of the presiding surgeon was to be studied, and his postoperative treatment was to be set forth by him for the consideration of those present.

Following the clinical work of the morning, the Members were to retire for lunch and to continue their meeting by a frank discussion of what they had observed throughout the morning hours. Out of these discussions, it was hoped, would result helpful and constructive criticism which would assist toward the attainment of our ultimate goal—better surgery, better surgeons, better service to mankind.

These meetings are to be held at least twice a year, and are to be supplemented by more frequent meetings of study groups in the respective cities, or communities, and are to be conducted in whatever manner the Officers and Members may decide.

We are pleased to announce at this time that there have been in operation for over a year, Postgraduate Study Guilds in a great number of the states of the Union. Indiana was the first to become active, with surgeons from Pennsylvania forming their nucleus only a few days later; they in turn were followed closely by West Virginia.

Colorado surgeons had organized their Guild, and since its organization, they have added to their number several professors from the University of Colorado School of Medicine.

New Mexico surgeons organized their Guild in 1939 and thus had made a contribution to the elevation of surgery in that State.

The Surgeons of different sections of Ohio who are members of the COLLEGE have been meeting as Study Clubs for over a year.

New England has only lately been organized and this unit is rapidly developing.

Other States are actively following the example of these already enumerated. And I am informed by President Douglass that inquiries are constantly reaching his desk from Fellows and Members of the COLLEGE in other States, throughout the country, requesting information and asking authority for the formation of Guilds in their districts.

The Constitution and By-Laws provide for three principal classes of membership: Fellows, Members, and Associate Members.

Fellows of the COLLEGE are those who have attained a high degree of efficiency, and are so recognized by the profession. They must be men of unusual and outstanding ability, and shall have contributed to scientific literature, and shall have made contributions in other ways to the art and science of surgery. They must, of course, devote all their time to surgery, and be looked upon as leaders in surgery, not only in their respective communities, but in their State, and throughout the country.

The Member of the COLLEGE shall be one who is younger in the service, and who has not yet reached that grade of efficiency demanded of a Fellow. He shall be known for his industry and his earnest desire to improve himself and increase his capabilities.

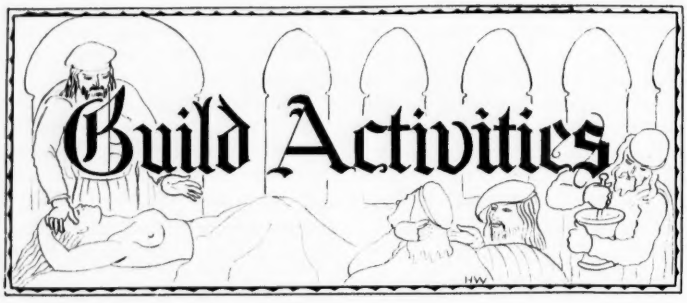
Associate Membership takes in that larger group of young men who are seriously and earnestly endeavoring to qualify for that high position which they have set out to attain.

It is to these men that the INTERNATIONAL COLLEGE OF SURGEONS extends a helping hand and would have them feel that this organization has been truly created as a COLLEGE, to function as a COLLEGE *per se*, in order that they might be better able to surmount the obstacles, which come to everyone, but particularly to the younger men.

The United States Chapter of the INTERNATIONAL COLLEGE OF SURGEONS has authorized the establishment of a Postgraduate Endowment Fund to receive bequests, gifts, and donations, the income from which will be used to send Professors of Surgery, from various Universities, as Instructors in their respective specialties to meetings of the Postgraduate Study Guild.

Thus it is to be hoped that the efforts of the Officers, Fellows, Members, and all Associates of the COLLEGE will bring about the realization of the program we have just outlined.

It is further to be hoped that this organization, unique in this respect, it being the only surgical organization in the world which provides such a program, and which has no conflict with any other Society or College, and which desires to assist any other Society or College in its program, may have the satisfaction of assisting these younger Surgeons of whom we have in the past demanded much, but have helped little, in attaining that degree of efficiency which will promote them to the class of Members and enable them to qualify and graduate to Fellowship.



SPRING MEETING OF NEW ENGLAND GUILD

The first spring meeting of the New England Guild, International College of Surgeons, was held March 27 at the Hospital of St. Raphael, New Haven, Conn., under the direction of the New England Activities Committee.

Surgery was observed from 9:30 to 12:30. Following luncheon, the afternoon program began with short addresses by Dr. G. S. Foster, chairman of the Activities Committee, and Dr. Joseph Linde, president of the Connecticut State Medical Society and Health Officer of New Haven.

Twenty-minute talks were given as follows: "Appendicitis," by Dr. James A. Gettings, chief surgeon of the Hospital of St. Raphael; "Spondylolisthesis," by Dr. Dennis O'Connor, attending orthopedist to Grace Hospital, New Haven, and assistant attending orthopedist at the New Haven Hospital; "Partial Intestinal Obstruction," by Dr. Andrew McQueeney, member of the surgical staff of St. Vincent's Hospital, Bridgeport, Conn.; "Gastric Surgery," by Dr. Edward Kirschbaum, surgeon to the Waterbury Hospital and medical examiner for Waterbury, Conn.; "Gall Bladder Surgery," by Dr. A. J. Mendillo, formerly chief surgeon of the Grace Hospital, New Haven; "Head Injuries," by Dr. William German, professor of surgery at Yale Medical School; and "Pathology," by Dr. Robert Nesbit, pathologist to St. Raphael's Hospital.

INDIANA STUDY GUILD

The Indiana Study Guild of the International College of Surgeons met at St. Anthony's Hospital, Terre Haute, on January 11 under the auspices of Dr. J. Rudolph Yung, president, assisted by Dr. John E. Dailey. The clinical part of the meeting began at 9 a.m. It was followed by a luncheon and round-table discussion which ended at 5 p.m.

Four operations, skilfully performed, were the *pièce de résistance* of the highly interesting and instructive clinic. There was a constant stream of questions and answers. The afternoon round-table discussion was informal, informative and enjoyable. There was freedom from restraint in asking or answering questions on the cases seen and on a variety of other subjects of general interest. The genuinely friendly atmosphere was admirably suited to the free exchange of opinion.

Dr. Yung discussed in detail the subject of goiter, stressing the importance of proper diagnosis and the interrelation of symptoms and signs. He called attention to the value of laryngoscopy in detecting malignancy. He elaborated on the hazards and difficulties encountered in removing intrathoracic goiters and on the technical steps which facilitate the operation. He also presented his interesting experiences with presacral resection in the treatment of dysmenorrhea; following this he demonstrated instruments, secured in France, which he uses successfully in banding and plating long bones.

Dr. V. A. Lapenta discussed uterine fibromyomas and technical procedures for their removal. Drs. John W. Emhardt, Myron Curtner, Yung, Simon Reisler and Dailey participated in the discussion.

Dr. Reisler called attention to a relatively rare condition of duodenal stenosis with atrophy following ulceration and duodenitis, which he attributes to destructive circulatory changes induced by chronic disease in the duodenum. He mentioned three such cases upon which he had operated successfully.

It was the unanimous opinion of all present that the Guild meetings offer a most satisfactory method of education.

—Simon Reisler, M.D., M.I.C.S.
Secretary, Indiana Study Guild

NEW ENGLAND STATES GUILD

The first meeting of the New England States Guild, International College of Surgeons, was held in Westfield State Sanitorium, Westfield, Mass., December 13, 1939, under the chairmanship of Dr. Frank H. Baehr, of Springfield, Mass., who personally arranged the details and program of this successful meeting. Excellent cooperation was afforded by Dr. Roy Morgan, superintendent of the Westfield State Sanatorium, and Dr. Paul V. Jakmauh, Commissioner of Health, State of Massachusetts.

As early as 8 o'clock in the morning the doctors began to arrive to participate in the proceedings. The morning program consisted of a "wet" clinic from 8:30 a.m. to 1:30 p.m. During this time the members of the hospital staff operated on some very difficult cases, demonstrating each phase of technic and presenting details regarding history, treatment, progress, residence in the hospital, follow-up treatment, social service investigation and observation for a five-year period. All phases of cancer work were gone into very carefully. Cancer of the breast and of the rectum were particularly emphasized and carefully demonstrated. The operations and proceedings were stimulating and were based on the concepts of the College as a teaching organization.

At 1 p.m. an excellent luncheon was served in the dining room of the hospital. During the lunch hour, the New England States Activities Committee met in a small room adjoining the dining room. Much time was given to reviewing applications of candidates. The eligibility of the applicants was carefully scrutinized, care being taken not to refuse admission to anyone who was worthy and not to exclude anyone for personal reasons, but to choose men of the type whose leadership would earn for the College in New England the highest standing as well as promote the maintenance of a high standard for all applicants. Dr. Baehr was elected permanent secretary of the Guild Committee.

The afternoon program began at 2:15 with an address of welcome by Dr. Jakmauh, followed by an outline of the basic principles and objectives of the College. Membership classification, objectives and ideals were explained. The afternoon was then devoted to the study of ten subjects, each one of which was covered by an expert in his special line of work. Fifteen minutes were allotted to each speaker, who illustrated his subject with drawings, lantern slides and radiograms; ten minutes were then given to discussion of the subject presented. Special mention should be made of talks given by Drs. Ernest M. Daland and Eugene W. Beauchamp on carcinoma of the breast; Dr. Baehr, on malignant melanoma; and Dr. J. W. Turner, on metastatic malignancies of the lungs and skeleton.

Through the cooperation of the hospital, a young lady recorded registrations. As each doctor entered the hospital, he was assisted in filling out a card, and thus a record of all in attendance was obtained. During the day requests were made for copies of the Constitution and By-Laws and the JOURNAL.

Before adjournment at 5:45 p.m., a vote of gratitude to Drs. Jakmauh, Morgan and Baehr was recorded.

—George S. Foster, M.D.
Chairman

HAVE YOU PAID YOUR DUES? MEMBERSHIP FEES SHOULD BE SENT TO DR. BENJAMIN I. GOLDEN, DAVIS MEMORIAL HOSPITAL, ELKINS, WEST VIRGINIA

COLLEGE PERSONALITIES

Professor Theodore Papayoannou

Vice-President, International College of Surgeons

Dr. Papayoannou, of Cairo, Egypt, whose splendid scientific competence has been recognized in surgical spheres, is a man of remarkable ability. His father, Lucas Papayoannou, was professor of anatomy at the University of Athens, Greece. The younger Papayoannou enjoyed an enviable record of training. He studied under

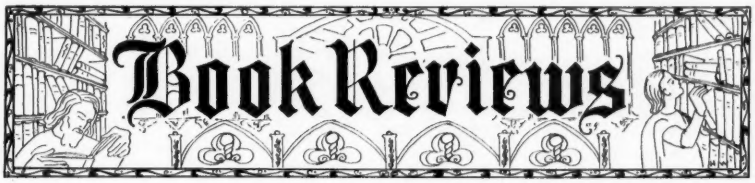
von Angerer and Amann in Munich and under Terrier, Hartmann, Pozzi, Tuffier, Lecène, Gosset and others in Paris. Erstwhile chief of the surgical staff of Saint Sauveur in Athens, chief of Areteion Hospital of the same city and from 1912-1920 chief surgeon of the Hellenic Hospital in Cairo. From 1920-1926 he was director and chief surgeon of Kasr-el-Doubara Hospital of Cairo. He is a founder member of the Egyptian Surgical Society, professor of surgery of the National University of Athens, member of the International Surgical society and a large number of other scientific organizations. He was decorated with the order of Saint Sauveur of Greece; Grand Officer of the Order of Saint Sepulchre; 2nd Grade of the German Red Cross; Commander of the order of Ismail of Egypt and others.

He is a philanthropist and an organizer of unquestionable merit and untiring activity. Many well earned laurels grace his brow. He is founder of a hospital in Cairo bearing his name, where his high conception of medical teaching and of professional ideals has moulded such students as Koumaris, Leonnades, Tombler and others. In his modern institution the true precepts of Aesculapian ideals are imparted to those who come to quench their thirst for knowledge. Not only the scientific work which is pursued here but the bounteous philanthropy dispensed liberally by its founder classes this institution in the first rank of charity organizations which are in operation in the capital of Egypt. A commendable *esprit de corps* is characteristic of its surgeons, physicians, chemists, radiologists and other coworkers. Papayoannou typifies the sympathetic colleague of high surgical ability and erudite judgment, besides being a prolific contributor to contemporary surgical literature in a number of languages. In his tasks as vice-president of the International College of Surgeons, he always is cooperative and gives much of his time and sincere effort to the furtherance of its ideals. Steadfastness of purpose is an outstanding trait of Papayoannou. For this and other weighty reasons it is easy to understand why he is held in such high esteem by his contemporaries and admirers in other walks of life. During the World War, Papayoannou rendered invaluable service by caring for the sick and wounded in the country of Gallipoli.

In March, 1930, he made an outstanding contribution to the surgical treatment of bilateral renal lithiasis; he pointed out the importance of operating in two or three stages instead of in one stage. In 1937 he saw this original work mature to fruition, having reported a rather large series of cases of bilateral calculus with pyonephrosis, in which he was able by his procedure to save the great majority of patients, thus establishing multiple stage interventions as a life saving measure in these cases. Also by his surgical ingenuity he modified the Whitehead operation. In a large series of cases the patients thus operated on were free from stricture formation and other complications remaining.

From his numerous scientific publications in English, French and German we cite only a few, a great many of which are classical. He wrote lucidly on "Echinococcus of the Optic Nerve"; "Permanent Bilateral Ankylosis of the Temporomaxillary Articulation"; "Surgical Treatment of Pulmonary Tuberculosis"; "Malignant Tumors

of the Thoracic Wall"; "Malarial Splenomegaly"; "Surgery of the Spleen"; "Treatment of Suppurative Arthritis of the Knee"; "Endothelial and Metastatic Tumors of the Ovary"; "Radical Treatment of Cancer of the Uterus"; "Malignant Tumors of the Ovary", etc., etc., etc. To continue citing would take us far afield. His works on asepsis, infection, sterilization of instruments and of ligature and suture material, on local anesthesia, the treatment of operative wounds of the abdomen, spinal anesthesia, rectal narcosis with avertin, place him among the first rank of contemporary surgeons, and fortunate indeed are those who come under his inspiring personality and feel the warmth of the friendship so characteristic of Papayoannou.



The Art of Anesthesia. By Paluel J. Flagg, M.D. Tenth edition. Price, $4.50. Pp. 713, with 192 illustraitons (66 in color). Philadelphia: Lea & Febiger, 1939.

As the title indicates, this volume deals with the art of anesthesia, principally inhalation anesthesia. Nitrous oxide, ethylene and ether are well covered. In the chapter, "Selection of Anesthetic," nitrous oxide and oxygen, or ethylene and oxygen, or nitrous oxide, oxygen and ether, or ether alone are the only anesthetics considered. The importance of resuscitation and prevention of asphyxial death are strongly emphasized as is also the intratracheal technic. The author presents his own technics well and for those who use those technics, the book will be appreciated.

CHAS. J. BETLACH

Atlas of Surgical Operations. By Elliott C. Cutler, M.D., F.A.C.S., Moseley Professor of Surgery, Harvard Medical School, and Surgeon-in-Chief, Peter Bent Brigham Hospital, Boston; and Robert Zollinger, M.D., F.A.C.S., Assistant Professor of Surgery, Harvard Medical School, and Senior Associate in Surgery, Peter Bent Brigham Hospital. Price, $8. Pp. 181, with 84 plates. New York: The Macmillan Company, 1939.

In producing this book, the authors have attempted to call back into general use the large-sized surgical volumes in vogue 50 to 80 years ago, the advantage of the large pages being that the majority of operations can be depicted on a single sheet. The book itself measures 15x10½ inches and the plates, 8½x12½ inches. Despite the ease with which the operative procedures can be followed, the fact remains that the book is somewhat unwieldly and does not fit into the average modern bookcase.

Since fascial planes are the most important part of thyroid surgery, a drawing showing the arrangement of the cervical fascia would be in place here. Plate II, figure 1 does not meet this purpose. In the chapter on indirect hernia, high ligation of the sac should be stressed, and a more thorough discussion of the repair of the wall should be included.

One misses, under the heading of gastrostomy, the inclusion of the more recent valvular and tubovalvular gastrostomies. Under the surgical treatment of hemorrhoids an illustration depicting the anatomical sites of the three primary piles would be advantageous.

It would perhaps have been well to have devoted more space to the important subject of hand infections. The technical details in this connection could perhaps have been stressed. Figure 15, page 167, could be improved upon.

It is hoped that in the next printing of this work, something on the more recent tendoplastic amputation of the leg will be included. This form seems to be replacing the time honored mid-thigh operation.

The text as a whole is far superior to the illustrations. The latter are diagramatic and, at best, rather poorly executed. Note, for example, those of intestinal anastomoses. Their diminutive size and lack of clarity leave much to be desired. They are difficult to follow, particularly for a beginner. Or note the lack of clarity in some of the steps depicting the Billroth operation.

The authors are acknowledged teachers of sur-

gery. Their endeavors in imparting from the vast store of their personal knowledge could be much enhanced by good illustrations and the inclusion of many standard procedures which the general surgeon should command. For example, the important operations on the male genital apparatus are wholly lacking. The methods described are those used by the authors.

The binding, printing and paper are excellent.

P.

La legatura dell'arteria splenica. By Giulio Bombi: Roma: Luigi Pozzi, 1938. Pp. 182.

THIS book of 182 pages summarizing the subject may be welcomed as something which fills a long felt need.

Following a historical sketch, a detailed account is given of the experimental results of ligating the splenic artery and of anatomic peculiarities shown by changes in the structure of the spleen, lymphatic glands and bone marrow. Morphologic changes in the blood after ligation and changes in metabolism are alluded to. The greater part of the book deals, of course, with the practical application of the method in the treatment of the various diseases of the blood, pernicious anemia, leukemia, Werlhof's disease, hemolytic jaundice, fibrosis of the spleen and Banti's disease. The anatomy present in and the surgical technic for each case are minutely described.

F. M.

The Practice of Urology. By Leon Herman, B.S., M.D., Professor of Urology, University of Pennsylvania, Graduate School of Medicine; Urologist to the Pennsylvania Hospital and to the Bryn Mawr Hospital; Consulting Urologist to the Methodist Episcopal and Burlington County (New Jersey) Hospitals. Price, $10. Pp. 923, with 504 illustrations and plates. Philadelphia: W. B. Saunders Company, 1939.

IN this volume of some 923 pages, closely written, the author has fulfilled a frankly expressed ambition to prepare a practical treatise on diseases of the urogenital system. A careful reading of the work gives conclusive evidence of the successful attainment of the author's mission—the presentation of a careful and well-prepared summary of our present day knowledge of urology and its closely allied genital conditions.

Conservative throughout, yet modern in its highest sense, this book reflects the vast clinical experience and technical skill of the author. It is intended primarily for the general practitioner and surgeon, but it might equally well serve as a student's textbook because of the simple and straightforward manner in which the subjects are discussed. Principal emphasis has been placed on modern methods in diagnosis and treatment, many of which are readily applied to office practice. This is especially true in the consideration of the important subject of gonorrhea, to which much space is devoted. The latest advances in treatment are fully considered, and it is noteworthy that the author has not discarded well-tried therapy of the past for the magical Sulfanilamide.

There are unusually excellent sections on general diagnosis with the aid of the cystoscope, the urethroscope and urography, which constitute the opening chapters. What is particularly refreshing and valuable about this work is the frank discussion of controversial problems in terms of the author's personal experience, when such discussion seems necessary for clarification from the practical angle. Throughout the work the reader is told what the author does and what he uses preferably in this or that condition. One can almost imagine himself working alongside of the author and absorbing his clinical teachings. This makes the volume exceptionally valuable to the student or the general practitioner.

The experienced urologist may take occasional issue with the author on details of therapy or methods of diagnosis, but the general tone throughout is sound and in line with the best urologic thought of the day.

This splendid volume may be considered a living monument to the surgical acumen and clinical experience of the author and can be highly commended as a most worthy contribution to American urologic literature. It was a pleasure to read this work and it is a still greater pleasure to recommend it.

A. L. W.

Technik der Knochenbruchbehandlung. By Böhler. Pp. 1,532, with 1530 illustrations. Sixth edition. Vienna: Wilhelm Maudrich, 1938.

THE sixth edition of Böhler's well-known work, which has been translated into English, Spanish, Russian, Polish, French and Italian, is an unrevised reprint of the fifth edition which appeared in 1937. The size of the volume (pp. 1,532) has doubled since 1933, and there are 1,530 illustrations.

Let us say at once that this is not a treatise on the treatment of fractures, for we are given a detailed description of complaints which have nothing to do with fractures. Take, for example, the chapter on injuries of the soft parts of the fingers and of the tendon sheaths, the chapter on injuries of the crucial ligament and injuries of the meniscus at the knee joint, or the dis-